

SEARCH REQUEST FORM

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Requester's Full Name: DAWN GARRETT Examiner #: 76107 Date: 2/3/2003
 Art Unit: 1774 Phone Number 30 5-0788 Serial Number: 09/986,136
 Mail Box and Bldg/Room Location: CP3 11D30 Results Format Preferred (circle): PAPER DISK E-MAIL
(Mailbox CP3-11D03)

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Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: ELECTROLUMINESCENT POLYMER HAVING GOOD CARRIER TRANSPORT
BALANCE AND ELECTROLUMINESCENT DEVICE USING THE SAME
 Inventors (please provide full names): _____

BYUNG HEE SOHN, KWANG YEON LEE, JUNG II JIN, KYUNG KON KIM,
 Earliest Priority Filing Date: [KOREA 2000-65866 11/7/2000] YOUNG RAE HONG

For Sequence Searches Only Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

Please search attached formulas (1) and (3)

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Searcher: <u>EL</u>	NA Sequence (#) _____	STN <u>\$ 215.20</u>
Searcher Phone #: _____	AA Sequence (#) _____	Dialog _____
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Date Searcher Picked Up: _____	Bibliographic _____	Dr. Link _____
Date Completed: <u>2-4-03</u>	Litigation _____	Lexis/Nexis _____
Searcher Prep & Review Time: <u>10</u>	Fulltext _____	Sequence Systems _____
Clerical Prep Time: _____	Patent Family _____	WWW/Internet _____
Online Time: <u>60</u>	Other _____	Other (specify) _____

—OCH₂CH—), δ 6.58(d, 2H, —CH=CH—), δ 6.77~7.26 (m, 8H, Ar—H), δ 7.89(d, 2H, Ar—H)

EXAMPLE 1

[0072] Measurement of Physical Properties of Luminescent Polymer

[0073] 1) Optical Properties

[0074] The luminescent polymer synthesized in the preparation Example 2 was dissolved in chlorobenzene and thus spin-coated on a quartz plate to form a polymeric membrane, which was measured for UV absorption peaks and PL (photoluminescence) spectrum. The results are shown in FIG. 4. UV absorption peaks were 326 nm, 340 nm and 461 nm, and PL maximum peaks were all 540 nm when excitation wavelength was measured at 320 nm, 340 nm, 400 nm and 420nm.

[0075] 2) Thermal Properties

[0076] Using TGA (thermogravimetric analysis) and DSC (differential scanning calorimetry), the thermal properties of the polymer were measured under nitrogen atmosphere at a rate of 10° C./min. The results are given in FIGS. 5a and 5b. In the TGA thermogram, no weight loss occurred up to 400° C. and decomposition of the polymer occurred at about 430° C., resulting in drastic weight loss. Also, in the DSC thermogram, T_g was observed at about 196° C., whereas T_m was not.

EXAMPLE 2

[0077] Fabrication Of Electroluminescent Device

[0078] Using the polymer prepared in the preparation Example 2, an electroluminescent device was fabricated according to the following procedure. A transparent electrode substrate comprising ITO (indium-tin oxide) coated onto a glass substrate was subjected to ultrasonication in acetone for 20 min. and then in IPA (isopropyl alcohol) for 20 min., and then washed with boiling IPA. Thereafter, PEDOT was spin-coated to a thickness of 25 nm thereon and dried. Next, 0.5% by weight of the polymer prepared in the preparation Example 2 was dissolved in chlorobenzene and then spin-coated on the PEDOT layer to a thickness of 80 nm. The rotation rate of the substrate was 2200 rpm and the period of time required for rotation was 50 seconds. The spin-coated substrate was dried at 80° C. for 1 hour on a hot-plate. On the substrate, calcium as a cathode was deposited to a thickness of 50 nm and then an aluminum layer 200 nm thick was deposited on the calcium layer, thus fabricating a final device shown in FIG. 6.

[0079] The device so fabricated [ITO/PEDOT/polymer/Ca/Al] was measured for its electrical and electroluminescent properties, by driving direct voltage as forward bias voltage on a light emitting area of 2 mm². The maximum wavelength of the emitted light was 534 nm of green light and emission of visible light began at 2.2 V. As shown in FIG. 7, the measured luminance was 33,700 cd/m² at 10 V.

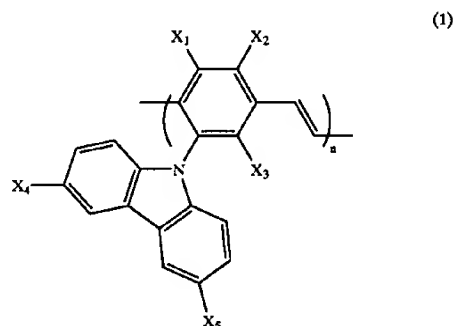
[0080] As described above, the electroluminescent polymer for use in an organic electroluminescent device, formed by introducing carbazole and an aliphatic alkyl or alkoxy group as a side chain to a poly(p-phenylene vinylene) (PPV) polymer chain, is advantageous in terms of excellent thermal stability, superior solubility in organic solvent, and high glass transition temperature. In addition, by controlling the transportability of holes, the transport difference between

electrons and holes is reduced, and thus the charge density therebetween becomes balanced.

[0081] The present invention has been described in an illustrative manner, and it is to be understood that the terminology used is intended to be in the nature of description rather than of limitation. Many modifications and variations of the present invention are possible in light of the above teachings. Therefore, it is to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

What is claimed is:

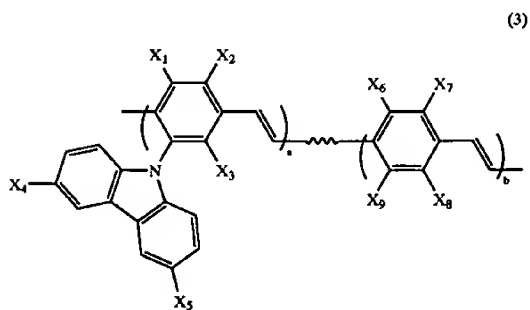
1. An electroluminescent polymer, represented by the following formula (1):



wherein X₁ to X₉ are independently a hydrogen atom, a linear alkyl or alkoxy group having 1 to 40 carbon atoms, a branched alkyl or alkoxy group having 3 to 40 carbon atoms, a cyclic alkyl group having 5 to 40 carbon atoms, a silyl group, or an aromatic group having 6 to 14 carbon atoms which is unsubstituted or substituted with at least one selected from the group consisting of an alkoxy group having 1 to 40 carbon atoms and an amine group.

2. The electroluminescent polymer as defined in claim 1, wherein the number average molecular weight of the electroluminescent polymer is about 10,000-1,000,000, and the molecular weight distribution thereof is about 1.5-5.0.

3. An electroluminescent polymer comprising (a) a PPV-based monomer substituted with a carbazole and an aliphatic alkyl or alkoxy group, and (b) a PPV-based monomer, the electroluminescent polymer represented by the following formula (3):



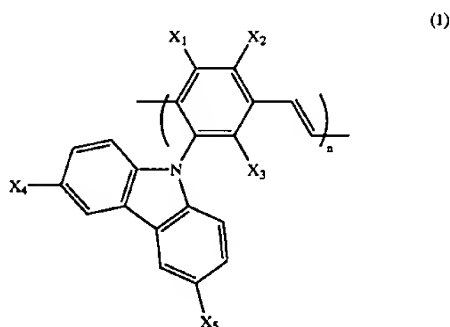
wherein, X_1 to X_5 are independently a hydrogen atom, a linear alkyl or alkoxy group having 1 to 40 carbon atoms, a branched alkyl or alkoxy group having 3 to 40 carbon atoms, a cyclic alkyl group having 5 to 40 carbon atoms, a silyl group substituted with at least one alkyl group having 1 to 40 carbon atoms, or an aromatic group having 6 to 14 carbon atoms which is unsubstituted or substituted with at least one selected from the group consisting of an alkoxy group having 1 to 40 carbon atoms and an amine group, and a and b are numbers such that $0.1 < a/(a+b) < 0.9$, and wherein at least one of the X substituents is a group other than a hydrogen atom.

4. The electroluminescent polymer as defined in claim 3, wherein the number average molecular weight of the electroluminescent polymer is about 10,000-1,000,000, and the molecular weight distribution thereof is about 1.5-5.0.

5. The electroluminescent polymer as defined in claim 3, wherein the monomer (b) is selected from the group consisting of 2,5-bis(chloromethyl)-4-(2'-ethylhexyloxy)anisole and 2,5-bis(chloromethyl)-3',7'-dimethyloctyloxy-4-methoxybenzene.

6. An electroluminescent polymer composition comprising

- (a) an electroluminescent polymer, represented by the following formula (1):



wherein X_1 to X_5 are independently a hydrogen atom, a linear alkyl or alkoxy group having 1 to 40 carbon atoms, a branched alkyl or alkoxy group having 3 to 40 carbon atoms, a cyclic alkyl group having 5 to 40 carbon atoms, a silyl group, or an aromatic group having 6 to 14 carbon atoms which is unsubstituted or substituted with at least one selected from the group consisting of an alkoxy group having 1 to 40 carbon atoms and an amine group, and

- (b) a PPV-based polymer,

wherein the electroluminescent polymer (a) and the PPV-based polymer (b) are mixed in a weight ratio of about 1:99-99:1.

7. The electroluminescent polymer composition as defined in claim 6, wherein the PPV-based polymer (b) is selected from the group consisting of poly(1-methoxy-4-(2'-ethylhexyloxy)-2,5-phenylene vinylene) and poly(1-methoxy-4-(3',7'-dimethyloctyloxy)-2,5-phenylene vinylene).

8. An electroluminescent device having a structure selected from the group consisting of an anode/light emitting layer/cathode, an anode/buffer layer/light emitting layer/

cathode, an anode/buffer layer/hole transport layer/light emitting layer/cathode, an anode/buffer layer/hole transport layer/light emitting layer/electron transport layer/cathode, and an anode/buffer layer/hole transport layer/light emitting layer/hole blocking layer/cathode, wherein the light-emitting layer comprises an electroluminescent polymer of claim 1.

9. The device as defined in claim 8, wherein the buffer layer comprises a material selected from the group consisting of polythiophene, polyaniline, polyacetylene, polypyrrole and polyphenylene vinylene derivatives.

10. The device as defined in claim 8, wherein the hole blocking layer comprises LiF or MgF_2 .

11. An electroluminescent device having a structure selected from the group consisting of an anode/light emitting layer/cathode, an anode/buffer layer/light emitting layer/cathode, an anode/buffer layer/hole transport layer/light emitting layer/cathode, an anode/buffer layer/hole transport layer/light emitting layer/electron transport layer/cathode, and an anode/buffer layer/hole transport layer/light emitting layer/hole blocking layer/cathode, wherein the light-emitting layer comprises an electroluminescent polymer of claim 3.

12. The device as defined in claim 11, wherein the buffer layer comprises a material selected from the group consisting of polythiophene, polyaniline, polyacetylene, polypyrrole and polyphenylene vinylene derivatives.

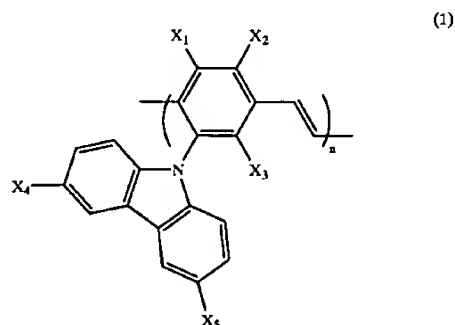
13. The device as defined in claim 11, wherein the hole blocking layer comprises LiF or MgF_2 .

14. An electroluminescent device having a structure selected from the group consisting of an anode/light emitting layer/cathode, an anode/buffer layer/light emitting layer/cathode, an anode/buffer layer/hole transport layer/light emitting layer/cathode, an anode/buffer layer/hole transport layer/light emitting layer/electron transport layer/cathode, and an anode/buffer layer/hole transport layer/light emitting layer/hole blocking layer/cathode, wherein the light-emitting layer comprises an electroluminescent polymer composition of claim 6.

15. The device as defined in claim 14, wherein the buffer layer comprises a material selected from the group consisting of polythiophene, polyaniline, polyacetylene, polypyrrole and polyphenylene vinylene derivatives.

16. The device as defined in claim 14, wherein the hole blocking layer comprises LiF or MgF_2 .

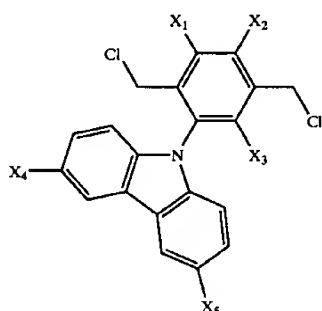
17. A method of producing an electroluminescent polymer, represented by the following formula (1):



wherein X_1 to X_5 are independently a hydrogen atom, a linear alkyl or alkoxy group having 1 to 40 carbon atoms, a branched alkyl or alkoxy group having 3 to 40 carbon atoms,

a cyclic alkyl group having 5 to 40 carbon atoms, a silyl group, or an aromatic group having 6 to 14 carbon atoms which is unsubstituted or substituted with at least one selected from the group consisting of an alkoxy group having 1 to 40 carbon atoms and an amine group,

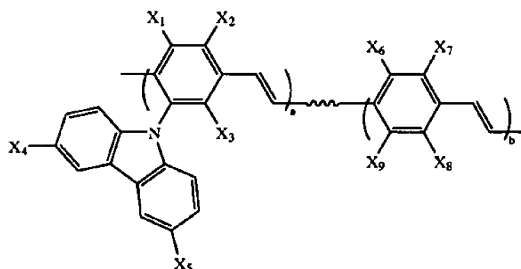
the method comprising the steps of dehydrohalogenation and 1,6-addition elimination of a carbazole-containing 1,4-bis(chloromethyl)-carbazolyl-benzene represented by the following formula (2), under alkali conditions:



(2)

wherein X_1 to X_5 are defined as in the above formula (1).

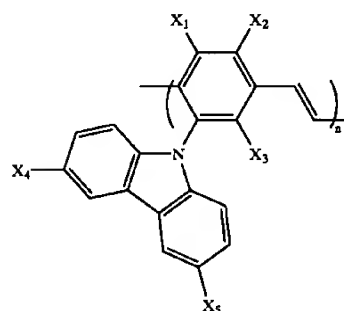
18. A method of producing an electroluminescent copolymer represented by the following formula (3):



(3)

wherein, X_1 to X_9 are independently a hydrogen atom, a linear alkyl or alkoxy group having 1 to 40 carbon atoms, a branched alkyl or alkoxy group having 3 to 40 carbon atoms, a cyclic alkyl group having 5 to 40 carbon atoms, a silyl group substituted with at least one alkyl group having 1 to 40 carbon atoms, or an aromatic group having 6 to 14 carbon atoms which is unsubstituted or substituted with at least one selected from the group consisting of an alkoxy group having 1 to 40 carbon atoms and an amine group, and a and b are numbers such that $0.1 < a/(a+b) < 0.9$, and wherein at least one of the X substituents is a group other than a hydrogen atom,

the method including the step of copolymerizing (a) a monomer unit of an electroluminescent polymer represented by the following formula (1):



(1)

wherein X_1 to X_9 are independently a hydrogen atom, a linear alkyl or alkoxy group having 1 to 40 carbon atoms, a branched alkyl or alkoxy group having 3 to 40 carbon atoms, a cyclic alkyl group having 5 to 40 carbon atoms, a silyl group, or an aromatic group having 6 to 14 carbon atoms which is unsubstituted or substituted with at least one selected from the group consisting of an alkoxy group having 1 to 40 carbon atoms and an amine group,

with (b) a PPV-based monomer.

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STRUCTURE FILE UPDATES: 3 FEB 2003 HIGHEST RN 485316-86-7
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L16 FILE 'ZCAPLUS' ENTERED AT 14:45:26 ON 04 FEB 2003
7 S L12
L17 28 S L14
L18 3 S L16 AND L17
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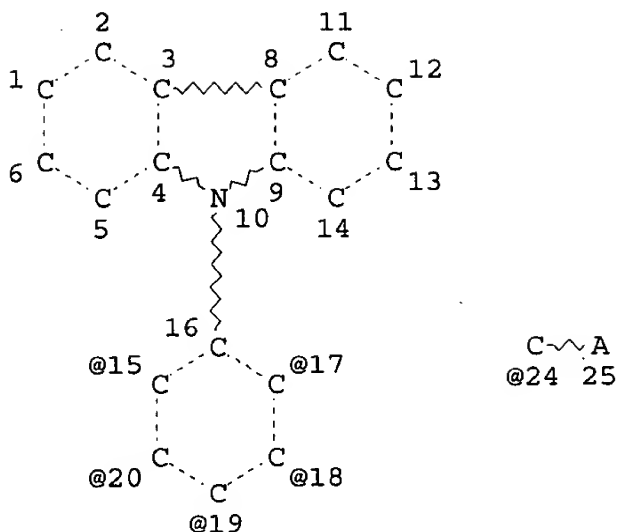
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L29 7 S L28 OR L19
L30 25 S L20 NOT L29

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STEREO ATTRIBUTES: NONE
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17 ANSWERS

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FILE COVERS 1907 - 4 Feb 2003 VOL 138 ISS 6
FILE LAST UPDATED: 3 Feb 2003 (20030203/ED)

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L29 ANSWER 1 OF 7 ZCAPLUS COPYRIGHT 2003 ACS
2002:540056 Document No. 137:101237 Electroluminescent polymer having good carrier transport balance and electroluminescent device using the same. Sohn, Byung Hee; Lee, Kwang Yeon; Jin, Jung Il; Kim, Kyung Kon; Hong, Young Rae (Samsung SDI Co., Ltd., S. Korea). U.S. Pat. Appl. Publ. US 2002093005 A1 20020718, 15 pp. (English). CODEN: USXXCO. APPLICATION: US 2001-986136 20011107. PRIORITY: KR 2000-65866 20001107.

GI

* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT *

AB Electroluminescent polymers are described by the general formula I and II (X1-9 = independently selected H, linear C1-40 alkyl or alkoxy groups, branched C3-40 alkyl or alkoxy groups, C5-40 cyclic alkyl groups, silyl groups, or C6-14 arom. groups which are unsubstituted or substituted with .gtoreq.1 C1-40 alkoxy groups and amine groups; $0 < a/(a+b) < 0.9$; and, for II, .gtoreq.1 of X1-9 is not H). Electroluminescent compns. comprising the polymers in combination with other polyphenylene vinylene derivs. are also described. Methods of prepg. the polymers described by the general formula I are described which entail dehydrohalogenation and 1,6-addn. elimination of an appropriate carbazole-contg. 1,4-bischloromethyl-carbazolyl-benzene. Methods of prepg. the polymers described by the general formula II are also described which entail copolymn. of monomer units of I with a polyphenylene vinylene deriv.-based monomer. Electroluminescent device employing the polymers are also described.

IT 406479-19-4P

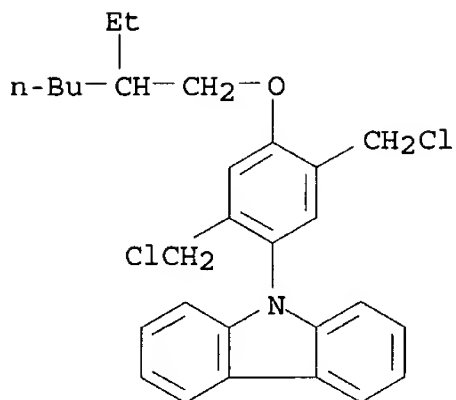
(electroluminescent polymers having good carrier transport balance and their prepn. and electroluminescent devices using them)

RN 406479-19-4 ZCAPLUS

CN 9H-Carbazole, 9-[2,5-bis(chloromethyl)-4-[(2-ethylhexyl)oxy]phenyl]-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 406479-18-3
 CMF C28 H31 Cl2 N O



IC ICM C09K011-06
 NCL 252301160
 CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
 Section cross-reference(s): 38, 76
 IT **406479-19-4P**
 (electroluminescent polymers having good carrier transport balance and their prepn. and electroluminescent devices using them)

L29 ANSWER 2 OF 7 ZCAPLUS COPYRIGHT 2003 ACS
 2002:245989 Document No. 136:347907 Electrical and optical studies of the organic thin film devices produced by cluster beam deposition methods. Kim, J. Y.; Kim, E. S.; Choi, J.-H. (Department of Chemistry and Center for Electro- and Photo-Responsive Molecules, Korea University, Seoul, 136-701, S. Korea). Materials Research Society Symposium Proceedings, 667(Luminescence and Luminescent Materials), G3.12/1-G3.12/6 (English) 2001. CODEN: MRSPDH. ISSN: 0272-9172. Publisher: Materials Research Society.
 AB The neutral and ionized cluster beam deposition (NCBD and ICBD) methods were applied to fabricate the new double-layer org. light emitting devices (OLEDs) with the structure of In-Sn-oxide (ITO)-coated glass/spin-coated poly[2-(N-carbazolyl)-5-(2-ethyl-hexyloxy)-1,4-phenylenevinylene] (CzEH-PPV)/8-hydroxyquinoline Al (Alq3)/Li:Al. The surface morphol. profiles measured by at. force microscopy (AFM) showed that the cluster beam deposition methods are efficient in producing uniform and smooth film surfaces. Photo- and electro-luminescence (PL, EL) spectroscopies demonstrated that while the new hole transporting medium CzEH-PPV is susceptible to the bombardment of energetic ionized beam, the introduction of the neutral buffer layer significantly improves the device characteristics, i.e., lower threshold and turn-on voltages and

higher external quantum efficiency (EQE). In addn., the effect of doping of highly fluorescent dye (DCM) into Alq3 layer showed a complete energy transfer, color-tuning capability and higher EQE compared to the undoped devices.

IT 393586-63-5, Poly[2-(N-carbazolyl)-5-(2-ethyl-hexyloxy)-1,4-phenylenevinylene]
(elec. and optical studies of org. thin film devices produced by cluster beam deposition methods)
RN 393586-63-5 ZCAPLUS
CN Poly[[(9H-carbazol-9-yl) [(2-ethylhexyl)oxy]-1,4-phenylene]-1,2-ethenediyl] (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 76

IT 2085-33-8, Aluminum tris(8-hydroxyquinolinato) 51325-91-8, DCM
393586-63-5, Poly[2-(N-carbazolyl)-5-(2-ethyl-hexyloxy)-1,4-phenylenevinylene]
(elec. and optical studies of org. thin film devices produced by cluster beam deposition methods)

L29 ANSWER 3 OF 7 ZCAPLUS COPYRIGHT 2003 ACS

2002:93557 Document No. 137:70162 Poly[2-(N-carbazolyl)-5-(2-ethylhexyloxy)-1,4-phenylenevinylene]/tris (8-hydroxyquinoline) aluminum heterojunction electroluminescent devices produced by cluster beam deposition methods. Kim, Jae-Yoo; Kim, Eun-Sook; Choi, Jong-Ho (Department of Chemistry and Center for Electro- and Photo-Responsive Molecules, Korea University, Anam-dong, Seoul, 136-701, S. Korea). Journal of Applied Physics, 91(4), 1944-1951 (English) 2002. CODEN: JAPIAU. ISSN: 0021-8979. Publisher: American Institute of Physics.

AB We have fabricated and characterized double-layer-type electroluminescent devices with the structure of indium-tin-oxide-coated glass/poly[2-(N-carbazolyl)-5-(2-ethylhexyloxy)-1,4-phenylenevinylene] (CzEH-PPV)/tris(8-hydroxyquinoline) aluminum (Alq3)/Li:Al, in which CzEH-PPV was used as a hole transport medium, and neutral and ionized cluster beam deposition (NCBD and ICBD) methods were applied to deposit Alq3. The surface morphol. obsd. by at. force microscopy shows that NCBD and esp. ICBD methods are more efficient in producing flat and smooth thin film surfaces in comparison to the conventional phys. vapor deposition method. Studies of photoluminescence, electroluminescence (EL), and device characteristics demonstrate that the polymeric thin film is susceptible to ion radiation damage and the NCBD-based devices show better device performance, including lower threshold and turn-on voltages, improved EL intensity-voltage, c.d.-voltage, and external quantum efficiency (EQE)-current characteristics. In addn., the doping effect of the highly fluorescent dye mol. 4-(dicyanomethylene)-2-methyl-6-(p-dimethylaminostyryl)-4H-pyran (DCM) into the Alq3 layer reveals a complete energy transfer, color-tuning capability and enhanced EQEs.

IT 393586-63-5, Poly[2-(N-carbazolyl)-5-(2-ethylhexyloxy)-1,4-phenylenevinylene]
(hole-transporting layer, emitting layer; CzEH-PPV/Alq3 heterojunction electroluminescent devices produced by cluster beam deposition methods)

RN 393586-63-5 ZCAPLUS

CN Poly[[(9H-carbazol-9-yl) [(2-ethylhexyl)oxy]-1,4-phenylene]-1,2-ethenediyl] (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 38, 76

IT 393586-63-5, Poly[2-(N-carbazolyl)-5-(2-ethylhexyloxy)-1,4-phenylenevinylene]
(hole-transporting layer, emitting layer; CzEH-PPV/Alq3 heterojunction electroluminescent devices produced by cluster beam deposition methods)

L29 ANSWER 4 OF 7 ZCAPLUS COPYRIGHT 2003 ACS

2002:35413 Document No. 136:279774 Synthesis and luminescence properties of poly(p-phenylenevinylene) derivatives carrying directly attached carbazole pendants. Kim, Kyungkun; Hong, Young-Rae; Lee, Seung-Wuk; Jin, Jung-Il; Park, Yongsup; Sohn, Byung-Hee; Kim, Woo-Hong; Park, Jae-Kun (Division of Chemistry and Molecular Engineering, Center for Photo- and Electro-Responsive Molecules, Korea University, Seoul, 136-701, S. Korea). Journal of Materials Chemistry, 11(12), 3023-3030 (English) 2001. CODEN: JMACEP. ISSN: 0959-9428. Publisher: Royal Society of Chemistry.

AB New org. sol. poly(p-phenylenevinylene) (PPV) derivs. (polymers 1 and 2) that carry hole-transporting carbazole pendants were synthesized and their photo- and electro-luminescence properties were studied. The first one is poly[2-(carbazol-9-yl)-5-(2-ethylhexyloxy)-1,4-phenylenevinylene] (polymer 1) which has both carbazole and 2-ethylhexyloxy pendant groups. The other one is poly[2-(carbazol-9-yl)-1,4-phenylenevinylene] (polymer 2) which has only the carbazole pendant group attached to the main chain phenylene ring. We fabricated single-layer EL devices using indium-tin oxide (ITO) coated glass anodes and aluminum cathodes and investigated their elec. characteristics. The EL device of polymer 2 emits green light ($\lambda_{\text{max}} = 490 \text{ nm}$) with the EL efficiency being lower than that of PPV. But the EL device of polymer 1 emits bright yellow-green light ($\lambda_{\text{max}} = 530 \text{ nm}$) and its external quantum efficiency was 550 times the efficiency of polymer 2 and 60 times that of a PPV EL device with the same configuration. Esp., the EL device with the configuration ITO coated glass/poly(3,4-ethylenedioxy-2,4-thienylene)/polymer 1/Ca/Al showed a low turn-on elec. field of 0.31 MV cm^{-1} and a high photometric efficiency of 4.4 cd A^{-1} with max. luminance being $30\,390 \text{ cd m}^{-2}$ at an elec. field of 1.50 MV cm^{-1} . Polymer 1 appears to perform better in EL than MEH-PPV.

IT 393586-63-5P 406479-19-4P

(synthesis and luminescence properties of poly(p-phenylenevinylene) derivs. having carbazole pendants)

RN 393586-63-5 ZCAPLUS

CN Poly[[(9H-carbazol-9-yl)[(2-ethylhexyl)oxy]-1,4-phenylene]-1,2-ethenediyl] (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

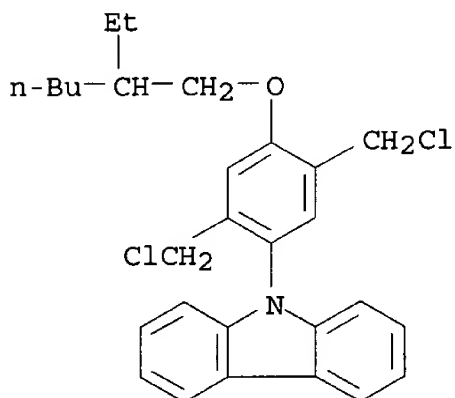
RN 406479-19-4 ZCAPLUS

CN 9H-Carbazole, 9-[2,5-bis(chloromethyl)-4-[(2-ethylhexyl)oxy]phenyl]-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 406479-18-3

CMF C28 H31 Cl2 N O



IT 214621-82-6P 406681-79-6P

(synthesis and luminescence properties of poly(p-phenylenevinylene) derivs. having carbazole pendants)

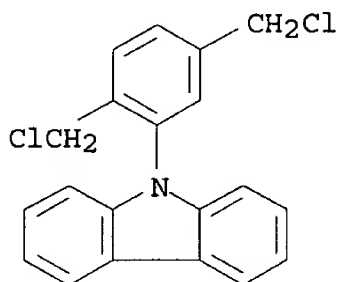
RN 214621-82-6 ZCAPLUS

CN 9H-Carbazole, 9-[2,5-bis(chloromethyl)phenyl]-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 214621-81-5

CMF C20 H15 Cl2 N



RN 406681-79-6 ZCAPLUS

CN Poly[[(9H-carbazol-9-yl)-1,4-phenylene]-1,2-ethenediyl] (9CI) (CA
INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 35-5 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 73

IT 393586-63-5P 406479-19-4P

(synthesis and luminescence properties of poly(p-phenylenevinylene) derivs. having carbazole pendants)

IT 58106-25-5P 154546-92-6P 214621-81-5P 214621-82-6P
264279-53-0P 406479-13-8P 406479-14-9P 406479-15-0P
406479-16-1P 406479-17-2P 406479-18-3P 406485-14-1P
406485-15-2P 406681-79-6P

(synthesis and luminescence properties of poly(p-phenylenevinylene) derivs. having carbazole pendants)

L29 ANSWER 5 OF 7 ZCAPLUS COPYRIGHT 2003 ACS

2002:8773 Document No. 136:248158 Two-photon absorption of electroluminescent conducting polymers. Lee, Geon Joon; Na, Mi Kyung; Jeon, Seung Joon; Kim, Kyung-Kon; Lee, Dong-Won; Hong, Young Rae; Jin, Jung-Il (Center for Electro- & Photo- Responsive Molecules and Research Division of Chemistry & Molecular Engineering, Korea University, Seoul, 136-701, S. Korea). Molecular Crystals and Liquid Crystals Science and Technology, Section A: Molecular Crystals and Liquid Crystals, 371, 257-260 (English) 2001. CODEN: MCLCE9. ISSN: 1058-725X. Publisher: Gordon & Breach Science Publishers.

AB Two-photon absorption(2PA) characteristics were studied of highly efficient electroluminescent poly(phenylene vinylene)s with alkoxy and carbazole or oxadiazole pendant groups. The polymers are poly[2-{4-[5-(4-t-butylphenyl)-1,3,4-oxadiazolyl]phenyl}-5-(2-ethylhexyloxy)-1,4-phenylene vinylene] [OxdEh-PPV] and poly[2-(N-carbazolyl)-5-(2-ethylhexyloxy)-1,4-phenylene vinylene] [CzEh-PPV]. The two-photon excitation spectra were measured and compared with one-photon excitation spectra. Two- and one-photon transitions satisfy different selection rules. The 2PA coeffs. were obtained by measuring the photoluminescence spectra after two- and one-photon absorption. At 840 nm, 2PA coeffs. of OxdEh-PPV and CzEh-PPV were 1.0 .times. 10-49 cm4.cntdot.s and 4.4 .times. 10-49

cm4.cntdot.s, resp.
 IT 393586-63-5, Poly[2-(N-carbazolyl)-5-(2-ethylhexyloxy)-1,4-phenylene vinylene]
 (two-photon absorption and electroluminescence of oxadiazolyl- and carbazolyl-substituted poly(phenylene vinylene) conducting polymers)
 RN 393586-63-5 ZCAPLUS
 CN Poly[[(9H-carbazol-9-yl) [(2-ethylhexyl)oxy]-1,4-phenylene]-1,2-ethenediyl] (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 36-5 (Physical Properties of Synthetic High Polymers)
 Section cross-reference(s): 73

IT 329790-94-5, Poly[2-{4-[5-(4-t-butylphenyl)-1,3,4-oxadiazolyl]phenyl}-5-(2-ethylhexyloxy)-1,4-phenylene vinylene]
 393586-63-5, Poly[2-(N-carbazolyl)-5-(2-ethylhexyloxy)-1,4-phenylene vinylene]
 (two-photon absorption and electroluminescence of oxadiazolyl- and carbazolyl-substituted poly(phenylene vinylene) conducting polymers)

L29 ANSWER 6 OF 7 ZCAPLUS COPYRIGHT 2003 ACS

2001:846054 Document No. 136:135294 Luminescence properties of poly(p-phenylenevinylene) derivatives carrying directly attached hole-transporting carbazole and electron-transporting phenyloxadiazole pendants. Hong, Yong-Rae; Lee, Dong Won; Kim, Kyungkon; Jin, Jung-Il; Lee, Cheol Eui; Lee, Hoo Min; Park, Yongsup; Shon, Byung-Hee; Park, Jae-Kun (Division of Chemistry and Molecular Engineering, Korea University, Seoul, 136-701, S. Korea). Macromolecular Symposia, 175(Polymerization Processes and Polymer Materials II), 169-175 (English) 2001. CODEN: MSYMEC. ISSN: 1022-1360. Publisher: Wiley-VCH Verlag GmbH.

AB New poly(p-phenylenevinylene) (PPV) derivs., polymer (I) and (II), that carry hole-transporting carbazole and electron-transporting phenyloxadiazole pendants were synthesized and their photo- and electroluminescence properties were studied. Polymer I is poly[2-(N-carbazolyl)-5-(2-ethylhexyloxy)-1,4-phenylenevinylene] that has both carbazole and 2-ethylhexyl pendant groups. And polymer II is poly[2-{4-[5-(4-t-butylphenyl)-1,3,4-oxadiazolyl]phenyl}-5-(2-ethylhexyloxy)-1,4-phenylenevinylene], which bears the 2-(4-t-butylphenyl)-5-phenyl-1,3,4-oxadiazole pendants. The optical properties of the polymer films were studied by UV-vis absorption, photoluminescence (PL) and electroluminescence (EL) spectroscopy. EL devices with the configuration of ITO/poly(3,4-ethylenedioxy-2,5-thienylene) (PEDOT) polymer/Ca/Al were constructed and the device performances were compared. Polymer I emits bright yellowish green light ($\lambda_{\text{max}} = 530 \text{ nm}$), whereas polymer II emits yellowish orange ($\lambda_{\text{max}} = 540 \text{ nm}$) light. The device fabricated using polymer I showed a low turn-on elec. field of 0.31 MV/cm and the max. luminance of 30,390 cd/m² at 1.50 MV/cm. Polymer II exhibited a little poorer device performance (turn-on elec. field: 0.94 MV/cm; max. luminance: 5,720 cd/m² at 2.74 MV/cm).

Maximum photometric efficiencies of the devices were 4.4 and 1.3 cd/A, resp.

IT 393586-63-5P

(luminescence properties of poly(p-phenylenevinylene) derivs. carrying carbazole and phenyloxadiazole pendants)

RN 393586-63-5 ZCAPLUS

CN Poly[[[9H-carbazol-9-yl] [(2-ethylhexyl)oxy]-1,4-phenylene]-1,2-ethenediyl] (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

CC 36-5 (Physical Properties of Synthetic High Polymers)

Section cross-reference(s): 73

IT 329790-94-5P 393586-63-5P

(luminescence properties of poly(p-phenylenevinylene) derivs. carrying carbazole and phenyloxadiazole pendants)

L29 ANSWER 7 OF 7 ZCAPLUS COPYRIGHT 2003 ACS

1998:685635 Document No. 129:308360 Highly efficient light-emitting diodes based on an organic-soluble poly(p-phenylenevinylene) derivative carrying the electron-transporting PBD moiety. Chung, Sung-Jae; Kwon, Ki-Young; Lee, Seung-Wuk; Jin, Jung-Il; Lee, Chang Hoon; Lee, Cheol Eui; Park, Yongsup (Dep. Chemistry, Advanced Materials Chemistry Research Center, Korea Univ., Seoul, 136, S. Korea). Advanced Materials (Weinheim, Germany), 10(14), 1112-1116 (English) 1998. CODEN: ADVMEW. ISSN: 0935-9648. Publisher: Wiley-VCH Verlag GmbH.

AB The fabrication and performance efficiency of electroluminescence (EL) devices using a poly(p-phenylenevinylene) (PPV) deriv. carrying the 2-(4-biphenyl)-5-(4-t-butylphenyl)-1,3,4-oxadiazole (PBD) structure is reported. The EL efficiency is improved to a remarkable extent which is ascribed to a more facile electron injection from the cathode to the polymer due to increased electron affinity of the polymer through the substituent. The PBD group enhances the electron-transport properties of the polymer.

IT 214621-82-6P

(LEDs based on org.-sol. poly(p-phenylenevinylene) deriv. carrying electron-transporting biphenyl-butylphenyl-oxadiazole and carbazole moieties, resp.)

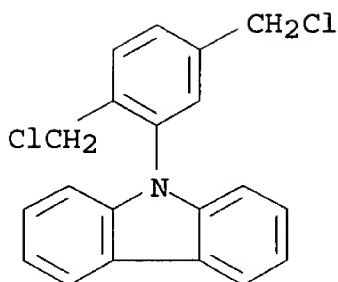
RN 214621-82-6 ZCAPLUS

CN 9H-Carbazole, 9-[2,5-bis(chloromethyl)phenyl]-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 214621-81-5

CMF C20 H15 Cl2 N

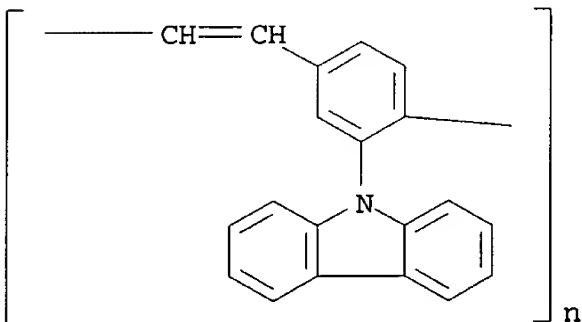


IT 214621-78-0P

(LEDs based on org.-sol. poly(p-phenylenevinylene) deriv.
carrying electron-transporting carbazole moiety)

RN 214621-78-0 ZCAPLUS

CN Poly[[2-(9H-carbazol-9-yl)-1,4-phenylene]-1,2-ethenediyl] (9CI) (CA
INDEX NAME)



CC 73-12 (Optical, Electron, and Mass Spectroscopy and Other Related
Properties)

Section cross-reference(s): 35, 38

IT 214621-82-6P

(LEDs based on org.-sol. poly(p-phenylenevinylene) deriv.
carrying electron-transporting biphenyl-butylphenyl-oxadiazole
and carbazole moieties, resp.)

IT 214621-78-0P

(LEDs based on org.-sol. poly(p-phenylenevinylene) deriv.
carrying electron-transporting carbazole moiety)

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L20 ANSWER 1 OF 25 ZCAPLUS COPYRIGHT 2003 ACS

2002:808029 Document No. 137:311694 Polymers for electric charge
transport materials and manufacturing methods therefor. Patz,
Matthias; Sakakibara, Mitsuhiro (JSR Ltd., Japan). Jpn. Kokai
Tokkyo Koho JP 2002308984 A2 20021023, 10 pp. (Japanese). CODEN:

JKXXAF. APPLICATION: JP 2001-115284 20010413.

AB (un)substituted diphenylaminophenylalkyl glycidyl ethers and carbazolyphenylalkyl glycidyl ethers are polymd. Thus, 4-diphenylaminobenzaldehyde was reduced with sodium borohydride to give 4-hydroxymethyltriphenylamine, treated with epichlorohydrin in aq. NaOH contg. benzyltrimethylammonium chloride to prep. 4-diphenylaminophenylmethyl glycidyl ether, and polymd. in the presence of aq. KOH to give a sol. polymer.

IT 473251-06-8P

(diphenylaminophenylalkyl glycidyl ether and carbazolyphenylalkyl glycidyl ether polymers for elec. charge transport materials and manufg. methods therefor)

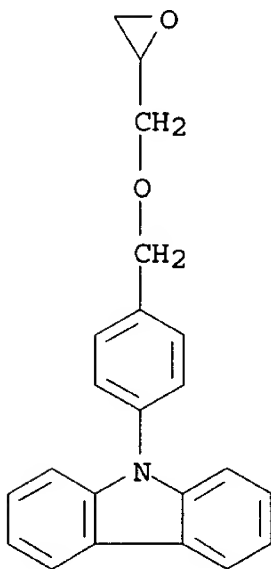
RN 473251-06-8 ZCAPLUS

CN Benzenamine, 4-[(oxiranylmethoxy)methyl]-N,N-diphenyl-, polymer with 9-[4-[(oxiranylmethoxy)methyl]phenyl]-9H-carbazole (9CI) (CA INDEX NAME)

CM 1

CRN 473251-04-6

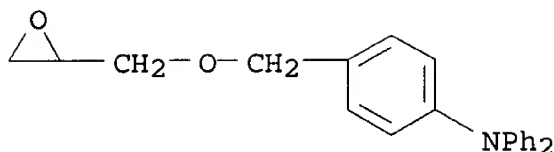
CMF C22 H19 N O2



CM 2

CRN 184946-76-7

CMF C22 H21 N O2



IC ICM C08G065-22
 ICS H01B001-12; H05B033-14; H05B033-22
 CC 37-3 (Plastics Manufacture and Processing)
 Section cross-reference(s): 25, 27, 35
 IT 473251-05-7P **473251-06-8P**
 (diphenylaminophenylalkyl glycidyl ether and
 carbazolyphenylalkyl glycidyl ether polymers for elec. charge
 transport materials and manufg. methods therefor)

L20 ANSWER 2 OF 25 ZCAPLUS COPYRIGHT 2003 ACS
 2002:313487 Document No. 136:348064 Organic electroluminescent device.
 Sakakibara, Mitsuhiko (JSR Ltd., Japan; Futaba Denshi Kogyo Co.,
 Ltd.; Kokusai Kiban Zairyo Kenkyusho K. K.). Jpn. Kokai Tokkyo
 Koho JP 2002124390 A2 20020426, 14 pp. (Japanese). CODEN: JKXXAF.
 APPLICATION: JP 2000-314941 20001016.

GI

* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT *

AB The invention relates to an org. electroluminescent device,
 comprising a hole transport layer made of the copolymer having the
 structural units represented by I and II in 5:95.apprx.95:5 mol
 ratio [R1 = H, alkyl, aryl; R2-5 = H, alkyl, alkoxy; X1 =
 p-C6H4CH2OCH2 and p-C6H4CH2; Z = OCO, CONH, and CONHCO; m, n = 0 or
 1; R6-8 = H, alkyl, aryl; X2 = phenylene or methylenephenylene; p =
 0 or 1].

IT **392658-32-1**
 (hole transport material for org. electroluminescent device)

RN 392658-32-1 ZCAPLUS

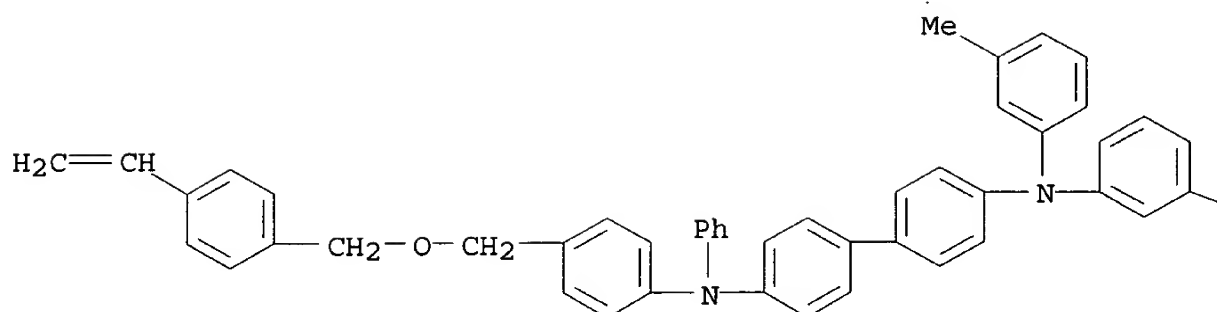
CN [1,1'-Biphenyl]-4,4'-diamine, N-[4-[[4-ethenylphenyl)methoxy)methyl]phenyl]-N',N'-bis(3-methylphenyl)-N-phenyl-, polymer with 9-(4-ethenylphenyl)-9H-carbazole (9CI) (CA INDEX NAME)

CM 1

CRN 392658-30-9

CMF C48 H42 N2 O

PAGE 1-A



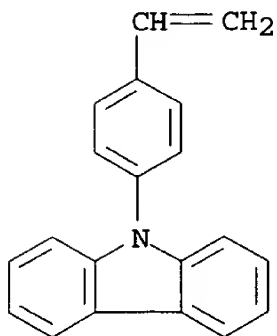
PAGE 1-B

Me

CM 2

CRN 52913-19-6

CMF C20 H15 N



IC ICM H05B033-22

ICS C08F212-32; C09K011-06; H05B033-14

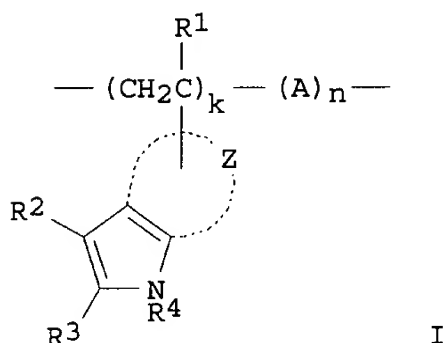
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 38

IT 392658-29-6 392658-31-0 **392658-32-1**
(hole transport material for org. electroluminescent device)

L20 ANSWER 3 OF 25 ZCAPLUS COPYRIGHT 2003 ACS
2002:265069 Document No. 136:301533 Organic luminescent material and device. Taguchi, Toshiki (Fuji Photo Film Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2002105445 A2 20020410, 19 pp. (Japanese).
CODEN: JKXXAF. APPLICATION: JP 2000-300716 20000929.

GI



AB The invention refers to an org. luminescent material I [R1 = H or methyl; R2-3 = H or substituents which may be joined to form a ring; R4 = H, (un)substituted alkyl, alkenyl, alkynyl, aryl, heterocyclyl, alkylcarbonyl, arylcarbonyl, alkylsulfonyl, arylsulfonyl, alkoxy carbonyl, aryloxy carbonyl, carbamoyl or sulfamoyl; Z = moiety comprising an arom. ring; A = copolymerizable monomer unit; k = 1 - 100; n = 0 - 9; k + n = 100].

IT **407637-37-0**

(org. luminescent material and device)

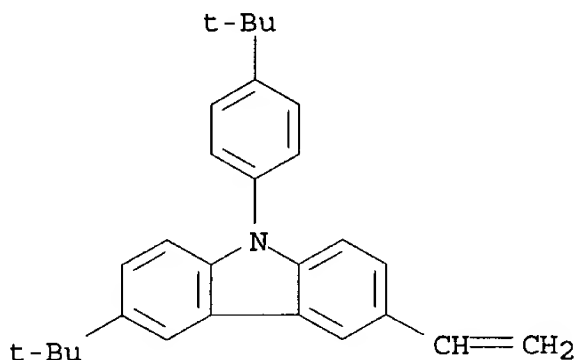
RN 407637-37-0 ZCAPLUS

CN 9H-Carbazole, 3-(1,1-dimethylethyl)-9-[4-(1,1-dimethylethyl)phenyl]-6-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 407637-36-9

CMF C28 H31 N



IC ICM C09K011-06
ICS C08F026-00; H05B033-14; H05B033-22
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
IT 852-38-0, PBD 25067-59-8, PVK 38215-36-0, Coumarin 6
94928-86-6 155090-83-8, Baytron P 293749-61-8 407637-24-5
407637-37-0 407637-39-2 407637-41-6 407637-43-8
407637-45-0
(org. luminescent material and device)

L20 ANSWER 4 OF 25 ZCAPLUS COPYRIGHT 2003 ACS
2002:179061 Document No. 137:70174 Mechanism of one- and two-photon absorption induced photoluminescence in PPV type, electroluminescent polymer. Lee, Geon Joon; Kim, Kyungkon; Jin, Jung-Il (Center for Electro- and Photo-Responsive Molecules, Korea University, Seoul, 136-701, S. Korea). Optics Communications, 203(1-2), 151-157 (English) 2002. CODEN: OPCOB8. ISSN: 0030-4018. Publisher: Elsevier Science B.V..

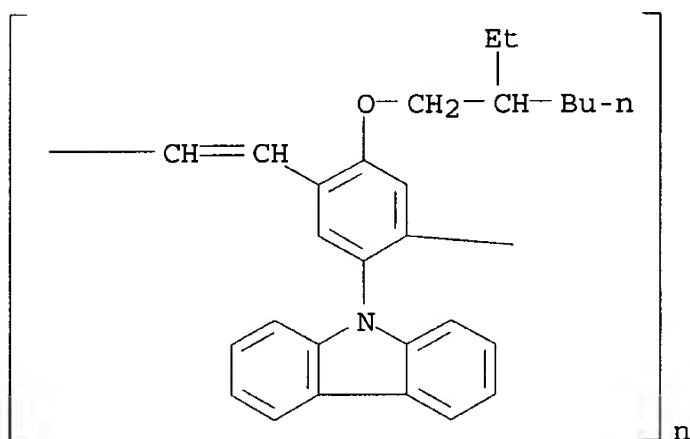
AB The authors report the luminescence properties in a poly(phenylenevinylene) deriv. with the carbazole pendent and alkoxy group (CzEH-PPV). The two-photon excitation spectrum showed that the threshold energy ($2 \text{ phcnst} \cdot \omega = 2.64 \text{ eV}$) of two-photon absorption (TPA) is larger than that (2.34 eV) expected by 1-photon excitation spectra. This implies that the two- and 1-photon absorptions satisfy different selection rules. Meanwhile, the two- and 1-photon absorption (OPA) induced photoluminescences (PLs) occur from the same exciton band that has a double min. adiabatic potential. The lifetimes of the upper and lower exciton states are 280 and 370 ps, resp. By comparing the PL spectrum of CzEH-PPV film to its electroluminescence spectrum of single-layer CzEH-PPV light-emitting device (ITO/CzEH-PPV/Al), the species generated by OPA or TPA are the charged carriers. For OPA-PL, the excitations having the pulse-energy larger than 2.3 μJ at 2.96 eV produce a spectrally narrowed emission band with its max. located at 2.14 eV with the spectral width of 23 meV. This is ascribed to the amplified spontaneous emission enhanced by the optical wave guiding in the polymer film.

IT 352675-59-3

(mechanism of one- and two-photon absorption induced photoluminescence in PPV type, electroluminescent polymer)

RN 352675-59-3 ZCAPLUS

CN Poly[[2-(9H-carbazol-9-yl)-5-[(2-ethylhexyl)oxy]-1,4-phenylene]-1,2-ethenediyl] (9CI) (CA INDEX NAME)



CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 36

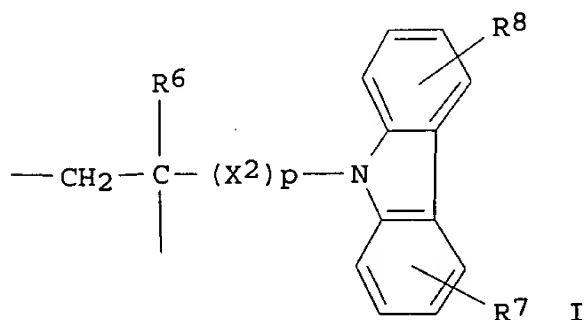
IT 352675-59-3

(mechanism of one- and two-photon absorption induced photoluminescence in PPV type, electroluminescent polymer)

L20 ANSWER 5 OF 25 ZCAPLUS COPYRIGHT 2003 ACS

2002:98555 Document No. 136:142360 Hole transporting vinyl polymers for organic electroluminescent (EL) devices with long life and low initial voltage. Sakakibara, Mitsuhiko (JSR Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2002037817 A2 20020206, 18 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2000-228928 20000728.

GI



AB The hole transporting polymers comprise repeating units of
 $\text{CH}_2\text{CR}_1\text{X}_1\text{mZnC}_6\text{H}_3\text{R}_2\text{N}(\text{C}_6\text{H}_4\text{R}_3)\text{Q}_2\text{N}(\text{C}_6\text{H}_4\text{R}_4)\text{C}_6\text{H}_4\text{R}_5$ ($\text{R}_1 = \text{H}$, alkyl, aryl;
 $\text{R}_2-5 = \text{H}$, alkyl, alkoxy, aryl, amino; $\text{X}_1 = \text{QCH}_2\text{OCH}_2$, QCH_2 ; $\text{Z} =$
 oxycarbonyl, CONH , CONHCO ; $\text{Q} = \text{p-phenylene}$; $\text{m}, \text{n} = 0, 1$) and
 vinylcarbozoles I ($\text{R}_6-8 = \text{H}$, alkyl, aryl; $\text{X}_2 = \text{phenylene}$,
 methylenephenylene; $\text{p} = 0, 1$) in the molar ratio of 5/95 to 95/5.

IT 392658-32-1P

(hole transporting vinyl polymers for org. EL devices with long
 life and low initial voltage)

RN 392658-32-1 ZCAPLUS

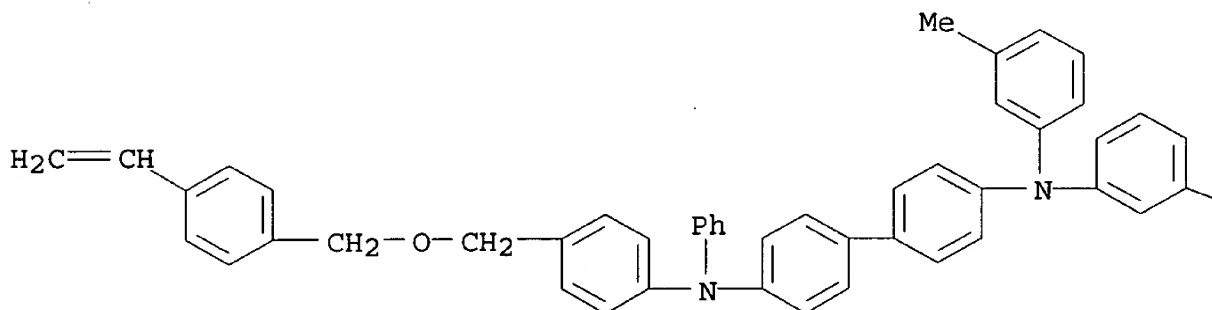
CN [1,1'-Biphenyl]-4,4'-diamine, N-[4-[[4-ethenylphenyl)methoxy)methyl]phenyl]-N',N'-bis(3-methylphenyl)-N-phenyl-, polymer with 9-(4-ethenylphenyl)-9H-carbazole (9CI) (CA INDEX NAME)

CM 1

CRN 392658-30-9

CMF C48 H42 N2 O

PAGE 1-A



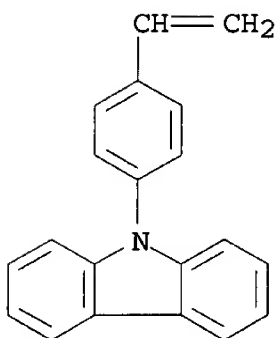
PAGE 1-B

Me

CM 2

CRN 52913-19-6

CMF C20 H15 N



IC ICM C08F212-32

ICS C08F218-04; C08F220-60; C08F226-12; H05B033-14; H05B033-22

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 37

IT 392658-29-6P 392658-31-0P **392658-32-1P**

(hole transporting vinyl polymers for org. EL devices with long life and low initial voltage)

L20 ANSWER 6 OF 25 ZCAPLUS COPYRIGHT 2003 ACS

2001:376206 Document No. 135:172767 Highly efficient light-emitting diodes based on an organic-soluble poly (p-phenylenevinylene) derivative carrying both the hole-transporting carbazole moiety and the 2-ethylhexyloxy group. Kim, K.; Hong, Y.-R.; Jin, J.-I. (Department of Chemistry and Center for Photo- and Electro-Responsive Molecules, Korea University, Anam-Dong, Seoul, 136-701, S. Korea). Synthetic Metals, 121(1-3), 1705-1706 (English) 2001. CODEN: SYMEDZ. ISSN: 0379-6779. Publisher: Elsevier Science S.A..

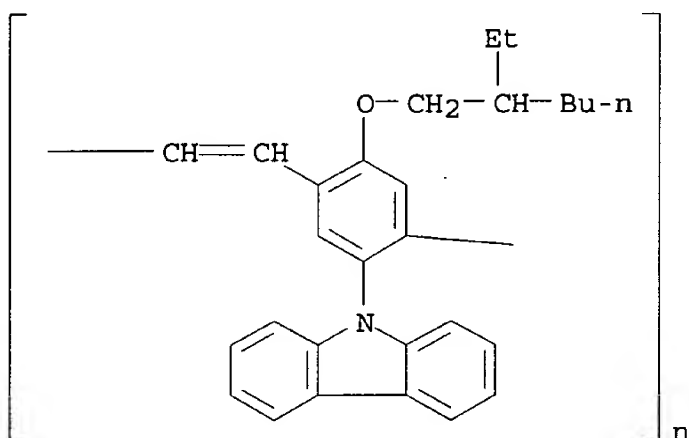
AB The authors synthesized a new polymer that carries the electron-donating alkoxy group and carbazole group attached to the phenylene ring and fabricated mono and bilayer devices consisting of electron transporting tris(8-quinolinato)aluminum and the polymer layers. The monolayer device showed low turn-on voltage and high external quantum efficiency (0.01%). Also external quantum efficiency of its bilayer device was 0.23%.

IT **352675-59-3**

(highly efficient light-emitting diodes based on org.-sol. poly (p-phenylenevinylene) deriv. carrying both hole-transporting carbazole moiety and 2-ethylhexyloxy group)

RN 352675-59-3 ZCAPLUS

CN Poly[[2-(9H-carbazol-9-yl)-5-[(2-ethylhexyl)oxy]-1,4-phenylene]-1,2-ethenediyl] (9CI) (CA INDEX NAME)



CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 36, 38

IT 2085-33-8, Aluminum tris(8-hydroxyquinolino) 352675-59-3
(highly efficient light-emitting diodes based on org.-sol. poly (p-phenylenevinylene) deriv. carrying both hole-transporting carbazole moiety and 2-ethylhexyloxy group)

L20 ANSWER 7 OF 25 ZCAPLUS COPYRIGHT 2003 ACS

2001:376192 Document No. 135:159572 Comparative studies on EL performances of the OLEDs prepared by PVD, NCBD and ICBD methods. Kim, E. S.; Kim, K.; Jin, J.-I.; Choi, J.-H. (Department of Chemistry and Center for Electro-and Photo-Responsive Molecules, Korea University, Anam-dong, Seoul, 136-701, S. Korea). Synthetic Metals, 121(1-3), 1677-1678 (English) 2001. CODEN: SYMEDZ. ISSN: 0379-6779. Publisher: Elsevier Science S.A..

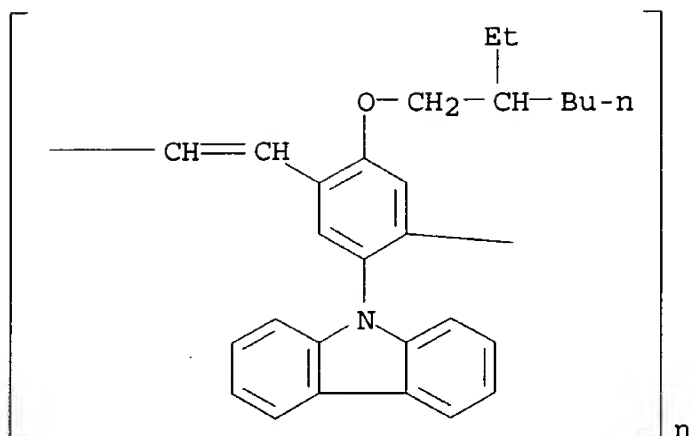
AB Org. light emitting diodes (OLEDs) with the structure of indium-tin-oxide glass/spin-coated poly[2-(N-carbazolyl)-5-(2-ethylhexyloxy)-1,4-phenylenevinylene]/8-hydroxyquinoline aluminum/Li:Al [ITO-glass/CzEH-PPV/Alq3/Li:Al] have been fabricated by applying three deposition methods: phys. vapor deposition (PVD), neutral and ionized cluster beam depositions (NCBD and ICBD). At. force microscopy measurements show that the weakly bound and highly directional cluster beam is effective in producing uniform flat film surfaces. Photo- and electro-luminescence spectra demonstrate that the NCBD and PVD methods produce more efficient EL devices and the introduction of neutral buffer layer to the ICBD devices enhances the performances. DCM-doped devices show color-tuning capability and higher external quantum efficiency compared to undoped devices.

IT 352675-59-3

(hole-transporting layer; comparative studies on EL performances of OLEDs prepd. by PVD, NCBD and ICBD methods)

RN 352675-59-3 ZCAPLUS

CN Poly[[2-(9H-carbazol-9-yl)-5-[(2-ethylhexyl)oxy]-1,4-phenylene]-1,2-ethenediyl] (9CI) (CA INDEX NAME)



CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 66, 76

IT 352675-59-3

(hole-transporting layer; comparative studies on EL performances of OLEDs prep'd. by PVD, NCBd and ICBD methods)

L20 ANSWER 8 OF 25 ZCAPLUS COPYRIGHT 2003 ACS

2000:689617 Document No. 134:48743 Photoelectron spectroscopy study of the electronic structures of poly(p-phenylenevinylene) derivatives. Park, Y.; So, Y.; Chung, S. -J.; Jin, J. -I. (Surface Analysis Group and National Research Laboratory for Surface Analysis, Korea Research Institute of Standards and Science, Taejeon, 305-600, S. Korea). Journal of the Korean Physical Society, 37(1), 59-63 (English) 2000. CODEN: JKPSDV. ISSN: 0374-4884. Publisher: Korean Physical Society.

AB Using x-ray and UPS (XPS and UPS), the authors have studied the electronic structures of poly(p-phenylenevinylene) (PPV) derivs. with different side chains. The results of the XPS peak-shape analyses for the C-C, the C-O, and the C-N bonds were consistent with the values deduced from the chem. formula and the tabulated peak-position shifts. The locations of the energy levels relevant to org. light-emitting device (OLED) applications of these materials were obtained from UPS spectra and were compared with the results of the OLED performance parameters. The values of ionization potential correlated well with the field strengths for the onset of luminescence. However, the efficiency of the devices did not follow the trends of electron affinity. The implications of these results, as well as other factors governing the efficiencies of OLEDs, are discussed.

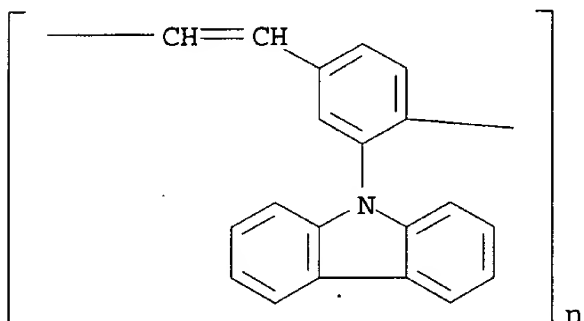
IT 214621-78-0

(photoelectron spectroscopy study of electronic structures of poly(p-phenylenevinylene) derivs. and their applications)

RN 214621-78-0 ZCAPLUS

CN Poly[[2-(9H-carbazol-9-yl)-1,4-phenylene]-1,2-ethenediyl] (9CI) (CA

INDEX NAME)



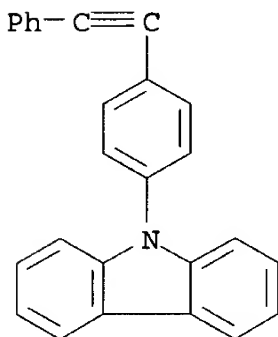
- CC 73-6 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 36
- IT 15082-28-7, 2-(4-Biphenyl)-5-(4-tert-butylphenyl)-1,3,4-oxadiazole
209625-39-8 209625-41-2 214621-77-9 **214621-78-0**
(photoelectron spectroscopy study of electronic structures of poly(p-phenylenevinylene) derivs. and their applications)
- L20 ANSWER 9 OF 25 ZCAPLUS COPYRIGHT 2003 ACS
2000:377752 Document No. 133:96262 Hole transport in substituted polydiphenylacetylene light-emitting devices: mobility improvement through carbazole moiety. Sun, R. G.; Wang, Y. Z.; Wang, D. K.; Zheng, Q. B.; Epstein, A. J. (Department of Physics, The Ohio State University, Columbus, OH, 43210-1106, USA). Synthetic Metals, 111-112, 403-408 (English) 2000. CODEN: SYMEDZ. ISSN: 0379-6779. Publisher: Elsevier Science S.A..
- AB Carrier-transport control is a crit. factor in achieving high performance of org. light-emitting devices (LEDs). The authors have compared hole conduction between polydiphenylacetylene (PDPA) derivs. without and with a carrier-transport moiety, such as poly[1-(p-n-butylphenyl)-2-phenylacetylene] (PDPA-Bu) and poly[1-(p-n-carbazolylphenyl)-2-phenylacetylene] (PDPA-Cz), resp. Hole transport was studied by current-voltage measurements and fitted using the space-charge limited current model. The hole mobility can be improved several orders of magnitude by attaching carbazolyl side groups to the PDPA back bone (PDPA-Cz), as compared to that of PDPA-Bu. The electroluminescence was studied and compared in heterostructured LEDs using PDPA-Bu and PDPA-Cz as hole-transport layers. Carrier transport and balance have significant roles in the performance of the substituted PDPA-based electroluminescent devices.
- IT **167697-14-5**
(hole transport and mobility in substituted polydiphenylacetylene light-emitting devices)
- RN 167697-14-5 ZCAPLUS
- CN 9H-Carbazole, 9-[4-(phenylethynyl)phenyl]-, homopolymer (9CI) (CA

INDEX NAME)

CM 1

CRN 167697-13-4

CMF C26 H17 N



CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 36, 76

IT 157673-32-0 **167697-14-5**

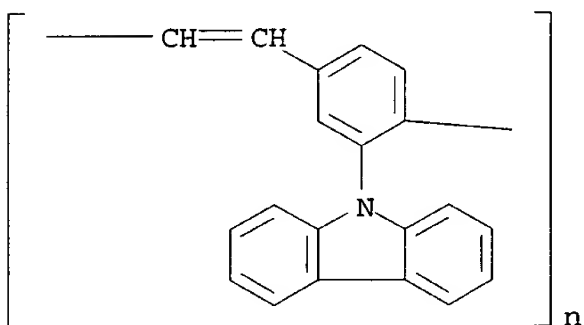
(hole transport and mobility in substituted polydiphenylacetylene light-emitting devices)

L20 ANSWER 10 OF 25 ZCAPLUS COPYRIGHT 2003 ACS

2000:179302 Document No. 132:322381 Time-Resolved Photoluminescence Study of Poly(p-phenylenevinylene) Derivative Polymers. Kim, Yong Hee; Jeoung, Sae Chae; Kim, Dongho; Chung, Sung-Jae; Jin, Jung-Il (National Creative Research Initiatives Center for Ultrafast Optical Characteristics Control and Spectroscopy Laboratory, Korea Research Institute of Standards and Science, Taejon, 305-600, S. Korea). Chemistry of Materials, 12(4), 1067-1070 (English) 2000. CODEN: CMATEX. ISSN: 0897-4756. Publisher: American Chemical Society.

AB We present the steady-state and time-resolved photoluminescence (PL) spectra of poly(p-phenylenevinylene)derivs., which exhibit a marked dependence on the side chains attached to the main chain. The PL spectra of poly(2-carbazolyl-p-phenylenevinylene) (PCzPV) and poly[2-[9-(10-phenyl)anthryl]-1,4-phenylenevinylene] (PPAPV) exhibit a vibronic structure with relatively short PL lifetimes. On the other hand, poly[[[2-[9-(10-phenyl)anthryl]phenoxy]hexoxy]-1,4-phenylenevinylene] (PAHPV) shows the broad and structureless emission with a long tail. In addn., the PL decay time of PAHPV is about 3 times longer than that of PCzPV or PPAPV. Poly[[2-(4-biphenyl)-5-(4-tert-butylphenyl)-1,3,4-oxadiazole]-p-phenylenevinylene] also exhibits the long PL decay time as well as the structureless and red-shifted emission. The difference in the photophys. properties of these polymers is discussed in terms of the electronic nature of the excited states influenced by the pendent

groups.
 IT 214621-78-0, Poly[[2-(9H-carbazol-9-yl)-1,4-phenylene]-1,2-ethenediyl]
 (time-resolved photoluminescence study of poly(p-phenylenevinylene) deriv. polymers)
 RN 214621-78-0 ZCAPLUS
 CN Poly[[2-(9H-carbazol-9-yl)-1,4-phenylene]-1,2-ethenediyl] (9CI) (CA INDEX NAME)



CC 36-5 (Physical Properties of Synthetic High Polymers)
 Section cross-reference(s): 37, 38, 73
 IT 209625-39-8, Poly[[5-[(2-ethylhexyl)oxy]-2-(10-phenyl-9-anthracenyl)-1,4-phenylene]-1,2-ethenediyl] 209625-41-2, Poly[[2-(10-phenyl-9-anthracenyl)-1,4-phenylene]-1,2-ethenediyl] 214621-77-9,
 Poly[[4'-[5-[4-(1,1-dimethylethyl)phenyl]-1,3,4-oxadiazol-2-yl][1,1'-biphenyl]-2,5-diyl]-1,2-ethenediyl] 214621-78-0,
 Poly[[2-(9H-carbazol-9-yl)-1,4-phenylene]-1,2-ethenediyl]
 (time-resolved photoluminescence study of poly(p-phenylenevinylene) deriv. polymers)

L20 ANSWER 11 OF 25 ZCAPLUS COPYRIGHT 2003 ACS

2000:74292 Document No. 132:214195 High luminescent efficiency in light-emitting polymers due to effective exciton confinement. Sun, R. G.; Wang, Y. Z.; Wang, D. K.; Zheng, Q. B.; Kylo, E. M.; Gustafson, T. L.; Epstein, A. J. (Department of Physics, The Ohio State University, Columbus, OH, 43210-1106, USA). Applied Physics Letters, 76(5), 634-636 (English) 2000. CODEN: APPLAB. ISSN: 0003-6951. Publisher: American Institute of Physics.

AB Highly efficient light-emitting polymers have become possible by mol. engineering. Photoluminescence (PL) quantum yield >90% in the solid state is reported for the alternating block copolymer of distyrylbenzene. The alternate arrangement of conjugated and nonconjugated segments with surrounding side groups for chromophores effectively confine the excitons for radiative emission. The effectiveness of the exciton confinement is confirmed through the temp. independence of the PL quantum yield. The time-resolved PL decay measurement supports this model through the independence of the PL yield on temp. and emission wavelength. The synthesized

copolymers were employed for the fabrication of electroluminescent (EL) devices, demonstrating high external EL efficiency with low operation threshold.

IT 167697-14-5

(high luminescent efficiency in light-emitting polymers due to effective exciton confinement)

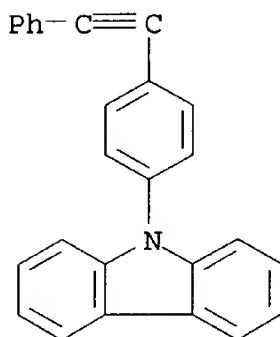
RN 167697-14-5 ZCAPLUS

CN 9H-Carbazole, 9-[4-(phenylethynyl)phenyl]-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 167697-13-4

CMF C26 H17 N



CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 36

IT 167697-14-5 219144-52-2

(high luminescent efficiency in light-emitting polymers due to effective exciton confinement)

L20 ANSWER 12 OF 25 ZCAPLUS COPYRIGHT 2003 ACS

2000:65074 Document No. 132:294087 Synthesis and characterization of PET copolyesters bearing carbazole pendants. Lee, Byung-Hee; Lee, Jun-Woo; Jin, Jung-Il (Center for Electro- and Photo-Responsive Molecules and Department of Chemistry, Korea University, Seoul, 136-701, S. Korea). Korea Polymer Journal, 7(6), 325-332 (English) 1999. CODEN: KPJOE2. ISSN: 1225-5947. Publisher: Polymer Society of Korea.

AB A series of copolyesters consisting of the oxyethyleneoxyterephthaloyl (ET) unit and the oxyethyleneoxy(9-carbazolyl)terephthaloyl (ECT) unit were prepd. and their properties were characterized. The copolyesters contg. >20 mol% ECT units were amorphous according to wide-angle x-ray diffractometry. The glass transition temp. of the copolyesters increased steadily with increasing ECT content, from 66.degree.C for PET to 103.degree.C for ECT homopolymer (PECT). All of the copolyesters exhibited

photoluminescence in soln. as well as in thin films. The wavelength of emitted light by the thin films ranged from about 425 to 600 nm with max. emission occurring at about 490 nm. Polymer solns., however, exhibited an addnl. luminescence with max. emitted light intensity at 410 nm. The shape of soln. emission spectra showed a strong dependence on the polymer concn. and compn. PECT doped with 3 mol% p-chloranil demonstrated an appreciable photocond.

IT 264279-51-8P, Dimethyl (9-carbazolyl)terephthalate-ethylene glycol copolymer 264279-52-9P, Dimethyl (9-carbazolyl)terephthalate-dimethyl terephthalate-ethylene glycol copolymer

(prepn. and photoproperties of carbazolyterephthalate polyesters)

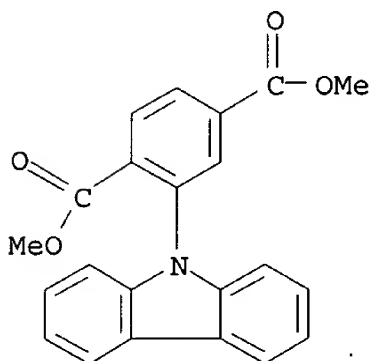
RN 264279-51-8 ZCAPLUS

CN 1,4-Benzenedicarboxylic acid, 2-(9H-carbazol-9-yl)-, dimethyl ester, polymer with 1,2-ethanediol (9CI) (CA INDEX NAME)

CM 1

CRN 264279-50-7

CMF C22 H17 N O4



CM 2

CRN 107-21-1

CMF C2 H6 O2

HO-CH₂-CH₂-OH

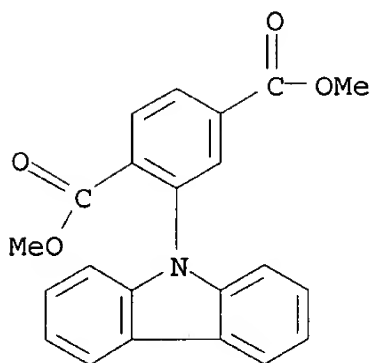
RN 264279-52-9 ZCAPLUS

CN 1,4-Benzenedicarboxylic acid, 2-(9H-carbazol-9-yl)-, dimethyl ester, polymer with dimethyl 1,4-benzenedicarboxylate and 1,2-ethanediol (9CI) (CA INDEX NAME)

CM 1

CRN 264279-50-7

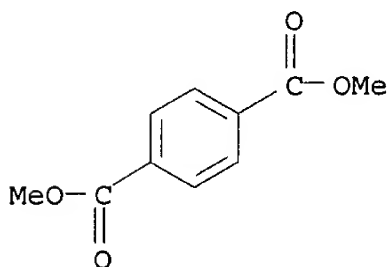
CMF C22 H17 N O4



CM 2

CRN 120-61-6

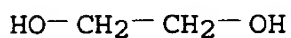
CMF C10 H10 O4



CM 3

CRN 107-21-1

CMF C2 H6 O2



CC 35-5 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 73, 76

IT 264279-51-8P, Dimethyl (9-carbazolyl)terephthalate-ethylene glycol copolymer 264279-52-9P, Dimethyl

(9-carbazolyl)terephthalate-dimethyl terephthalate-ethylene glycol copolymer 264884-59-5P, Dimethyl (9-carbazolyl)terephthalate-ethylene glycol copolymer, SRU
(prepn. and photoproperties of carbazolylterephthalate polyesters)

L20 ANSWER 13 OF 25 ZCAPLUS COPYRIGHT 2003 ACS
1999:756830 Document No. 132:7426 Multilayer organic electroluminescent devices using carbazole derivatives and their manufacture. Nakaya, Tadao; Yamauchi, Takao; Konishi, Takanori (Taiho Kogyo Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 11329737 A2 19991130 Heisei, 32 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 1998-260328 19980914. PRIORITY: JP 1998-63370 19980313.

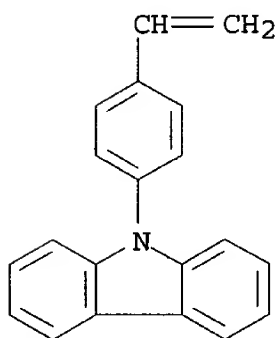
AB The devices have hole-transporting layers contg. compds. having 9-carbazolyl groups. Prepn. methods of the carbazole derivs. by using (A) biphenyl, (B) 4,4'-diiodobiphenyl, (C) 4-iodoaniline, (D) carbazole, or (E) 4-iodoacetophenone as starting materials are claimed. The devices show improved lifetime and high luminance.

IT 251319-13-8P
(manuf. of carbazole derivs. for hole-transporting layers of multilayer electroluminescent devices)

RN 251319-13-8 ZCAPLUS
CN 9H-Carbazole, 9-(4-ethenylphenyl)-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 52913-19-6
CMF C20 H15,N



IC ICM H05B033-22
ICS C09K011-06; C07D209-82

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 27, 28, 38

IT 57102-51-9P 57102-52-0P 57102-62-2P 116292-11-6P
212385-49-4P 212385-74-5P 212385-75-6P 251316-77-5P

251316-79-7P 251316-80-0P 251316-83-3P 251316-85-5P
251316-89-9P 251319-13-8P

(manuf. of carbazole derivs. for hole-transporting layers of
multilayer electroluminescent devices)

L20 ANSWER 14 OF 25 ZCAPLUS COPYRIGHT 2003 ACS

1999:671793 Document No. 132:23226 Synthesis and gas permeability of
poly(diphenylacetylenes) with substituents. Masuda, Toshio;
Teraguchi, Masahiro; Nomura, Ryoji (Department of Polymer Chemistry,
Kyoto University, Kyoto, 606-01, Japan). ACS Symposium Series, 733,
28-37 (English) 1999. CODEN: ACSMC8. ISSN: 0097-6156. Publisher:
American Chemical Society.

AB Polymn. of diphenylacetylenes with a variety of substituents is
presented, and the properties of the polymers are surveyed. The
TaCl₅/cocatalyst (n-Bu₄Sn, Et₃SiH, 9-BBN, BuLi, etc.) systems have
proven to be quite effective for the polymn. of diphenylacetylenes,
providing high mol. wt. polymers in good yields. Most of the
produced polymers are completely sol. in org. solvents. High
thermal stability and film-forming ability of the polymers make it
possible to prep. thin tough membranes with high gas permeability.
Interestingly, quite large PO₂ values (1100 Barrer) are obsd. with
poly(diphenylacetylenes) bearing bulky round-shaped
para-substituents such as tert-Bu, trimethylsilyl, and
trimethylgermyl groups.

IT 167697-14-5P

(synthesis and gas permeability of poly(diphenylacetylenes) with
various substituents)

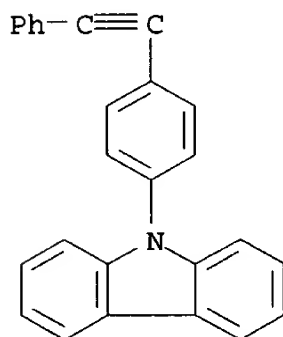
RN 167697-14-5 ZCAPLUS

CN 9H-Carbazole, 9-[4-(phenylethynyl)phenyl]-, homopolymer (9CI) (CA
INDEX NAME)

CM 1

CRN 167697-13-4

CMF C26 H17 N



CC 35-4 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 36, 38

IT 136459-73-9P 136459-75-1P 146284-12-0P 146284-14-2P
146284-16-4P 146284-18-6P 146284-20-0P 146284-22-2P
146284-24-4P 146284-26-6P 149890-77-7P 153973-41-2P
153973-42-3P 155676-33-8P 155676-34-9P 155676-35-0P
157673-32-0P 159507-20-7P 159507-21-8P **167697-14-5P**
183201-90-3P 183201-93-6P 192569-31-6P 195208-63-0P
195208-64-1P 195208-66-3P 195208-67-4P

(synthesis and gas permeability of poly(diphenylacetylenes) with various substituents)

L20 ANSWER 15 OF 25 ZCAPLUS COPYRIGHT 2003 ACS

1999:456013 Document No. 131:215057 Time-resolved photoluminescence study of PPV derivatives with electron - and hole - transporting moieties. Kim, Yong Hee; Jeoung, Sae Chae; Kim, Dongho; Chung, Sung - Jae; Jin, Jung - Il (Spectroscopy Lab., Korea Research Institute of Standards and Science, Taejon, 305-600, S. Korea). Synthetic Metals, 102(1-3), 961-962 (English) 1999. CODEN: SYMEDZ. ISSN: 0379-6779. Publisher: Elsevier Science S.A..

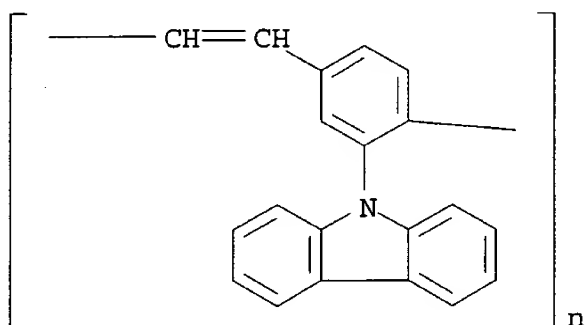
AB The decay dynamics of photoexcited poly[(2-carbazol)-p-phenylene-vinylene] (PCzPV) and poly[(2-(4-biphenyl)-5-(4-tert-butyl-phenyl)-1,3,4-oxadiazole)-p-phenylene-vinylene] (PPDPV) were investigated. The cw photoluminescence spectrum of PCzPV is composed of well-resolved two emission bands and a weak but apparent emission band at much lower energy. On the other hand, PPDPV exhibits a broad and featureless emission band. The photoluminescence decay of PPDPV is almost independent of excitation energy and temp. However, when the side chain substituent is changed to carbazole, the overall decay dynamics strongly depend on the excitation wavelength as well as temp. The decay time const. at 580 nm of photoexcited PCzPV is shortened with a change in the excitation energy from 400 nm to 300 nm at 13 K. These results in the PCzPV and PPDPV are interpreted in terms of the electronic properties of substituent and excimer process between substituent and main chain.

IT **214621-78-0**

(time-resolved photoluminescence study of PPV derivs. with electron - and hole - transporting moieties)

RN 214621-78-0 ZCAPLUS

CN Poly[[2-(9H-carbazol-9-yl)-1,4-phenylene]-1,2-ethenediyl] (9CI) (CA INDEX NAME)



CC 37-5 (Plastics Manufacture and Processing)

Section cross-reference(s): 73, 76

IT 214621-77-9 214621-78-0

(time-resolved photoluminescence study of PPV derivs. with electron - and hole - transporting moieties)

L20 ANSWER 16 OF 25 ZCAPLUS COPYRIGHT 2003 ACS

1999:237537 Document No. 130:330230 Electroluminescence of carbazole substituted polyacetylenes. Sun, Runguang; Wang, Yunzhang; Zou, Xiaoming; Fahlam, Mats; Zheng, Qianbing; Kobayashi, Takayoshi; Masuda, Toshio; Epstein, Arthur J. (Department of Physics, The Ohio State University, Columbus, OH, 43210-1106, USA). Proceedings of SPIE-The International Society for Optical Engineering, 3476(Organic Light-Emitting Materials and Devices II), 332-337 (English) 1998. CODEN: PSISDG. ISSN: 0277-786X. Publisher: SPIE-The International Society for Optical Engineering.

AB The authors present photo- and electro-luminescence, and hole mobility measurements of carbazole (Cz) substituted polyacetylene (PA-Cz) and poly(diphenylacetylene) (PDPA-Cz). The photoluminescence (PL) of the interband transition in PA-Cz thin film is quenched. PDPA-Cz shows a green-yellow emission with a PL efficiency .apprx.30% of the interband transition. The hole mobility of PDPA-Cz is .apprx.10⁻⁷ cm²/Vs and the ionization energy is 5.3 eV. PDPA-Cz forms robust thin films and is thermally stable up to 470.degree.. For a structure of ITO/PDPA-Cz/Alq(tris(8-quinolinolato)aluminum)/MgAg EL quantum efficiency over 1% is achieved.

IT 223802-28-6P

(electroluminescence of carbazole substituted polyacetylenes)

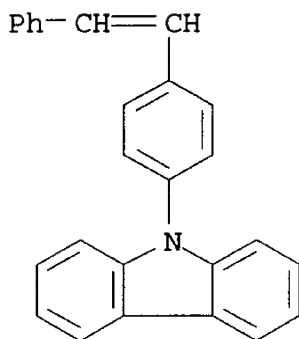
RN 223802-28-6 ZCAPLUS

CN 9H-Carbazole, 9-[4-(2-phenylethenyl)phenyl]-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 223802-27-5

CMF C26 H19 N



CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 36, 65

IT 25085-68-1P 223802-28-6P

(electroluminescence of carbazole substituted polyacetylenes)

L20 ANSWER 17 OF 25 ZCAPLUS COPYRIGHT 2003 ACS

1998:640065 Document No. 130:102355 Efficient green electroluminescent cells using a poly(p-phenylene vinylene) multiblock copolymer sandwiched between carrier-transporting layers. Zheng, Qianbing; Sun, Runquang; Kobayashi, Takayoshi; Hong, Zhiyong; Wang, Daike; Jing, Xiabin; Wang, Fosong; Minami, Nobutsugu; Yase, Kiyoshi; Masuda, Toshio (Dep. Phys., Grad. Sch. of Sci., The University of Tokyo, Bunkyo-ku, Tokyo, 113, Japan). Synthetic Metals, 97(1), 13-15 (English) 1998. CODEN: SYMEDZ. ISSN: 0379-6779. Publisher: Elsevier Science S.A..

AB With a newly synthesized poly(p-phenylene vinylene) (PPV) multiblock copolymer used in a triple-layer structure, efficient green light-emitting diodes with low driving voltage were fabricated. The devices are turned on at 2.5 V, the brightness at 5 V is >100 cd/m² and at 7 V is .apprx.1650 cd/m², with an external quantum efficiency of .apprx.1%.

IT 167697-14-5

(efficient green electroluminescent cells using a poly(p-phenylene vinylene) multiblock copolymer sandwiched between carrier-transporting layers and copolymer properties)

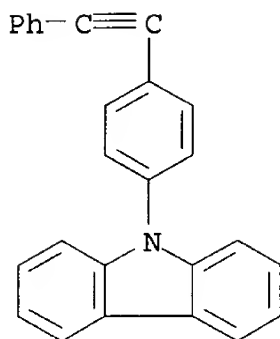
RN 167697-14-5 ZCAPLUS

CN 9H-Carbazole, 9-[4-(phenylethynyl)phenyl]-, homopolymer (9CI) (CA INDEX NAME)

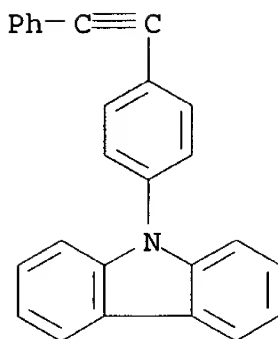
CM 1

CRN 167697-13-4

CMF C26 H17 N



- CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 38
- IT 2085-33-8, Aluminum tris(8-hydroxyquinolinato) 167697-14-5
219144-52-2
(efficient green electroluminescent cells using a poly(p-phenylene vinylene) multiblock copolymer sandwiched between carrier-transporting layers and copolymer properties)
- L20 ANSWER 18 OF 25 ZCAPLUS COPYRIGHT 2003 ACS
1998:52289 Document No. 128:173554 Conducting polymer-C60 heterojunctions: polarity-independent electroluminescent cells. Zheng, Qianbing; Sun, Runguang; Zhang, Xianmin; Masuda, Toshio; Kobayashi, Takayoshi (Dep. Physics, Graduate School Sci., Univ. Tokyo, Tokyo, 113, Japan). Japanese Journal of Applied Physics, Part 2: Letters, 36(12B), L1675-L1677 (English) 1997. CODEN: JAPLD8. ISSN: 0021-4922. Publisher: Japanese Journal of Applied Physics.
- AB The characterization of polarity-independent electroluminescent cells based on the heterostructure of a conducting polymer, a sol. para carbazoyl substituted poly(diphenylacetylene) (PDPA-Cz), and buckminsterfullerene, C60, is reported. The operation of the devices under reverse direct-current (d.c.) bias is discussed in terms of interfacial charge transfer between PDPA-Cz and C60.
- IT 167697-14-5
(conducting polymer-C60 heterojunctions as polarity-independent electroluminescent cells)
- RN 167697-14-5 ZCAPLUS
- CN 9H-Carbazole, 9-[4-(phenylethynyl)phenyl]-, homopolymer (9CI) (CA INDEX NAME)
- CM 1
- CRN 167697-13-4
- CMF C26 H17 N



CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

IT 99685-96-8, Fullerene c60 167697-14-5
(conducting polymer-C60 heterojunctions as polarity-independent electroluminescent cells)

L20 ANSWER 19 OF 25 ZCAPLUS COPYRIGHT 2003 ACS

1997:769789 Document No. 128:82060 Electroluminescent devices based on poly(diphenylacetylene) with carbazolyl side groups. Zheng, Qianbing; Sun, Runguang; Zhang, Xianmin; Masuda, Toshio; Kobayashi, Takayoshi (Department Physics, Graduate School Science, University Tokyo, Tokyo, 113, Japan). Japanese Journal of Applied Physics, Part 2: Letters, 36(11B), L1508-L1510 (English) 1997. CODEN: JAPLD8. ISSN: 0021-4922. Publisher: Japanese Journal of Applied Physics.

AB External quantum efficiency of electroluminescent devices with a heterostructure using carbazolyl-substituted poly(diphenylacetylene) (PDPA-Cz) as a hole-transporting layer was as high as 2%.

IT 167697-14-5
(electroluminescent devices based on poly(diphenylacetylene) with carbazolyl side groups)

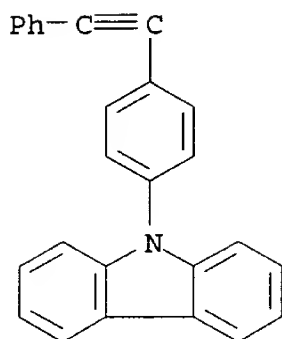
RN 167697-14-5 ZCAPLUS

CN 9H-Carbazole, 9-[4-(phenylethynyl)phenyl]-, homopolymer (9CI) (CA INDEX NAME)

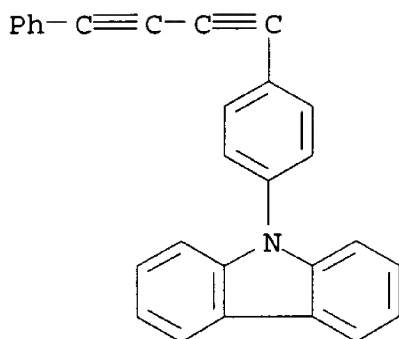
CM 1

CRN 167697-13-4

CMF C26 H17 N



- CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
- IT 7429-90-5, Aluminum, uses 25067-59-8, Poly(N-vinylcarbazole) 50926-11-9, ITO 157673-32-0 167697-14-5 (electroluminescent devices based on poly(diphenylacetylene) with carbazolyl side groups)
- L20 ANSWER 20 OF 25 ZCAPLUS COPYRIGHT 2003 ACS
- 1996:73710 Document No. 124:118328 1-Phenyl-2-[p-(N-carbazolyl)phenyl]acetylene polymers. Masuda, Toshio; Tatemori, Hiroshi (Masuda Toshio, Japan). Jpn. Kokai Tokkyo Koho JP 07300512 A2 19951114 Heisei, 8 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1994-117615 19940506.
- AB The moldable and thermally stable polymers have redox activity and are useful for, e.g. modified electrodes and in chiral oxidn.-redn. reaction, etc. Thus, a title polymer with wt.-av. mol. wt. 263,000 and no.-av. mol. wt. 811,000 was obtained by polymn. of 1-phenyl-2-[p-(N-carbazolyl)phenyl]acetylene in the presence of TaCl₅ and tetrabutyltin.
- IT 173352-95-9P (manuf. of)
- RN 173352-95-9 ZCAPLUS
- CN 9H-Carbazole, 9-[4-(4-phenyl-1,3-butadiynyl)phenyl]-, homopolymer (9CI) (CA INDEX NAME)
- CM 1
- CRN 173352-94-8
- CMF C28 H17 N



IC ICM C08F038-00

CC 35-4 (Chemistry of Synthetic High Polymers)

IT 173352-95-9P
(manuf. of)

L20 ANSWER 21 OF 25 ZCAPLUS COPYRIGHT 2003 ACS

1995:755418 Document No. 123:170381 Synthesis and properties of a poly(diphenylacetylene) containing carbazolyyl groups. Tachimori, Hiroshi; Masuda, Toshio (Department Polymer Chemistry, Kyoto University, Kyoto, 606-01, Japan). Journal of Polymer Science, Part A: Polymer Chemistry, 33(12), 2079-85 (English) 1995. CODEN: JPACEC. ISSN: 0887-624X. Publisher: Wiley.

AB 1-(P-N-Carbazolylylphenyl)-2-phenylacetylene (p-CzDPA) was polymd. by TaCl5-cocatalyst systems (cocatalysts: n-Bu4Sn, Et3SiH, and 9-BBN) to produce acetone-insol. polymers in about 60-70% yields. Poly(p-CzDPA) was a yellowish-orange solid, mostly sol. in toluene, chloroform, etc., and its wt.-av. mol. wts. were around 4 .times. 105. This polymer formed a tough film by soln. casting, and was thermally very stable (the onset temp. of wt. loss in TGA in air 470.degree.). The polymer showed photocond. and redox activity.

IT 167697-14-5P

(prepn. and characterization of poly[(carbazolylylphenyl)phenylacetylene])

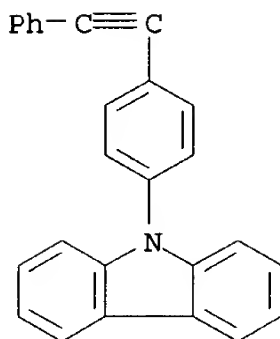
RN 167697-14-5 ZCAPLUS

CN 9H-Carbazole, 9-[4-(phenylethynyl)phenyl]-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 167697-13-4

CMF C26 H17 N



CC 35-4 (Chemistry of Synthetic High Polymers)

IT 167697-14-5P

(prepn. and characterization of poly[(carbazolylphenyl)phenylacetylene])

L20 ANSWER 22 OF 25 ZCAPLUS COPYRIGHT 2003 ACS

1995:605499 Document No. 123:22108 Electrophotographic photoreceptor with excellent abrasion resistance and high sensitivity. Matsushima, Asao; Ooshiba, Takeo; Eto, Yoshihiko (Konishiroku Photo Ind, Japan). Jpn. Kokai Tokkyo Koho JP 07013376 A2 19950117 Heisei, 36 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1993-159387 19930629.

AB In the title electrophotog. photoreceptor comprising at least a charge-generating layer and a charge-transporting layer on a conductive support, the charge-transporting layer is made up of .gtoreq.2 layers, wherein (1) the charge-transporting layer close to the surface layer contains a polycarbonate and a polyarylamine photoconductor with sp. structures, and (2) the charge-transporting layer close to the support contains a low mol-wt. substance having a high pos. hole transportability.

IT 163711-78-2

(electrophotog. photoreceptor with excellent abrasion resistance and high sensitivity)

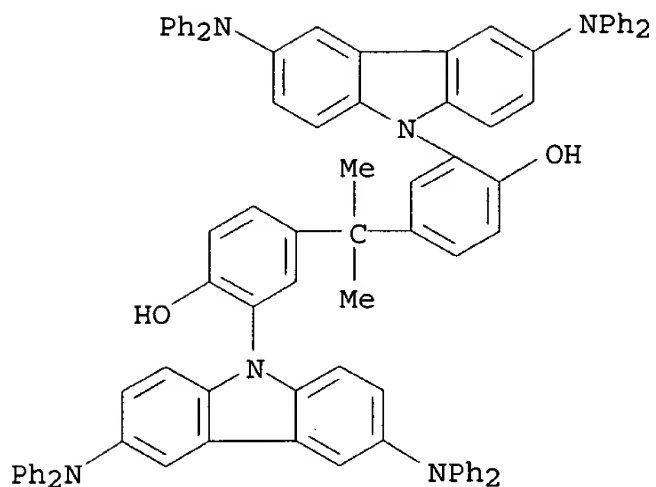
RN 163711-78-2 ZCAPLUS

CN Carbonic acid, polymer with 4,4'-cyclohexylidenebis[phenol] and 4,4'-(1-methylethylidene)bis[2-[3,6-bis(diphenylamino)-9H-carbazol-9-yl]phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 147614-18-4

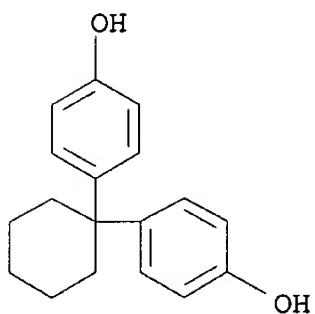
CMF C87 H66 N6 O2



CM 2

CRN 843-55-0

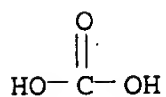
CMF C18 H20 O2



CM 3

CRN 463-79-6

CMF C H2 O3



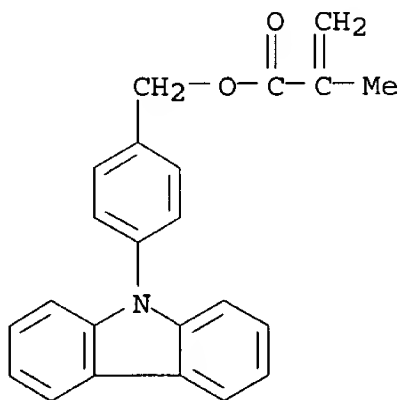
IC ICM G03G005-07
ICS G03G005-047; G03G005-05

- CC 74-3 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
- IT 93216-32-1 100803-48-3 100803-49-4 100803-50-7 102667-39-0
 119344-18-2 121265-58-5 121671-22-5 138982-22-6 139184-48-8
 139624-15-0 149389-08-2 163156-11-4 163711-76-0 163711-77-1
163711-78-2 163711-80-6 163711-81-7 163711-82-8
 163711-83-9 163711-84-0 163711-85-1 163711-86-2 163711-87-3
 (electrophotog. photoreceptor with excellent abrasion resistance and high sensitivity)
- L20 ANSWER 23 OF 25 ZCAPLUS COPYRIGHT 2003 ACS
- 1995:17751 Document No. 122:161503 Synthesis and polymerization of N-(p-hydroxymethylphenyl)carbazole acrylate and N-(p-hydroxymethylphenyl)carbazole methacrylate. Ye, Dakeng; Xie, Youliang (Dep. Chem., Zhongshan Univ., Guangzhou, 510275, Peop. Rep. China). Gaofenzi Xuebao (5), 614-19 (Chinese) 1993. CODEN: GAXUE9. ISSN: 1000-3304.
- AB Two new vinyl monomers, N-(p-hydroxymethylphenyl)carbazole acrylate and N-(p-hydroxymethylphenyl)carbazole methacrylate, were synthesized. The polymns. of the 2 monomers have been studied by different conditions. The structures of monomers and polymers were examd. by elemental anal., IR, ¹HNMR, and UV spectroscopies. The mol. wts. of polymers were detd. by dynamic osmometry.
- IT **161573-90-6P**
 (kinetics and mechanism of copolymn. of carbazole acrylate and carbazole methacrylate and polymer structure)
- RN 161573-90-6 ZCAPLUS
- CN 2-Propenoic acid, 2-methyl-, [4-(9H-carbazol-9-yl)phenyl]methyl ester, polymer with [4-(9H-carbazol-9-yl)phenyl]methyl 2-propenoate (9CI) (CA INDEX NAME)

CM 1

CRN 161573-89-3

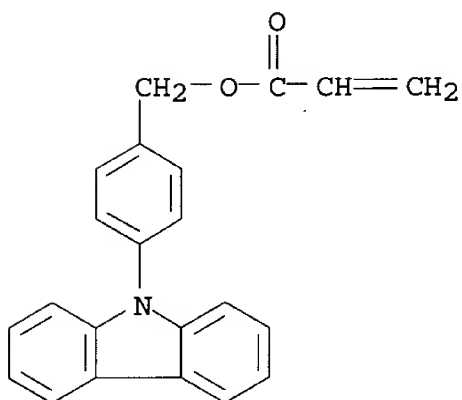
CMF C23 H19 N O2



CM 2

CRN 161573-88-2

CMF C22 H17 N O2



CC 35-4 (Chemistry of Synthetic High Polymers)

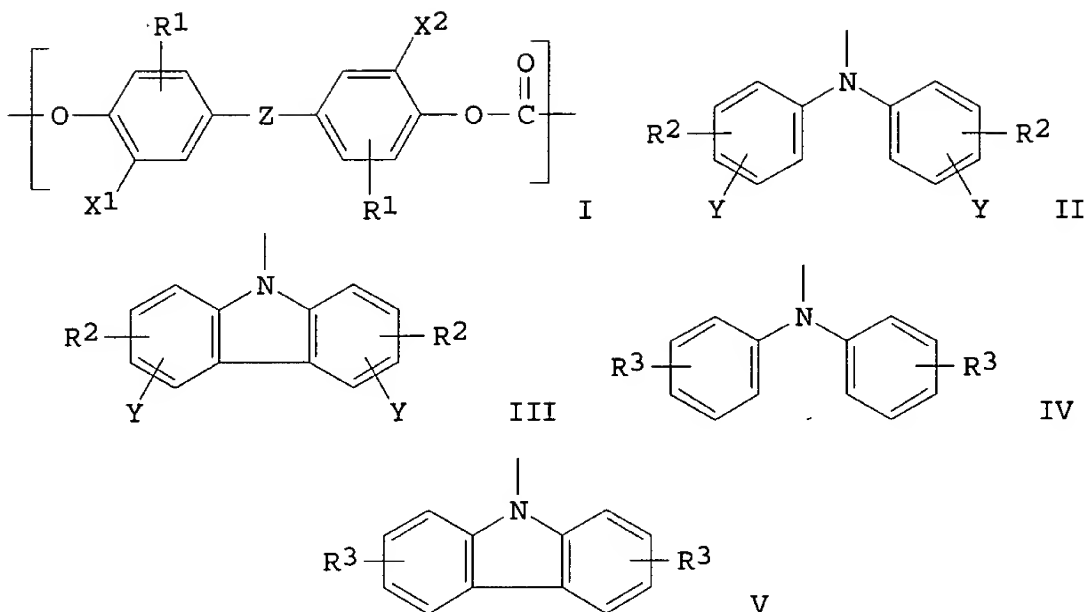
IT 161573-90-6P

(kinetics and mechanism of copolymn. of carbazole acrylate and carbazole methacrylate and polymer structure)

L20 ANSWER 24 OF 25 ZCAPLUS COPYRIGHT 2003 ACS

1993:505806 Document No. 119:105806 Charge transport polycarbonate, its manufacture, and electrophotographic photoreceptor using same. Kawasaki, Nobuo; Sakamoto, Hideji; Morishita, Hironobu (Idemitsu Kosan Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 04320420 A2 19921111 Heisei, 20 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1991-113884 19910419.

GI



AB The title polycarbonate has the repeating units I ($R_1 = H$, C1-5 alkyl; $X_1 = R_1$, II, III; $R_2 = R_1$; $Y = H$, IV, V; $R_3 = R_1$; $X_2 = II$, III; $Z = \text{direct bond, O, S, SO}_2, (-\text{CH}_2-)_p$; $p = 2-10$); the reduced viscosity $[\eta]$ of the soln. 0.5 g/dL using CH_2Cl_2 as solvent is >0.1 dL/g at 20.degree.. The title polycarbonate is manufd. by reacting a dihydric phenol with a carbonic acid ester-forming compd. such as phosgene. The title polycarbonate is used as an electrophotog. charge transport substance. The electrophotog. photoreceptor using the title polycarbonate as a charge transport substance and a binder resin shows improved durability and electrophotog. characteristics such as high sensitivity, etc.

IT 149388-33-0

(binder and charge transport substance, for electrophotog. photoreceptor)

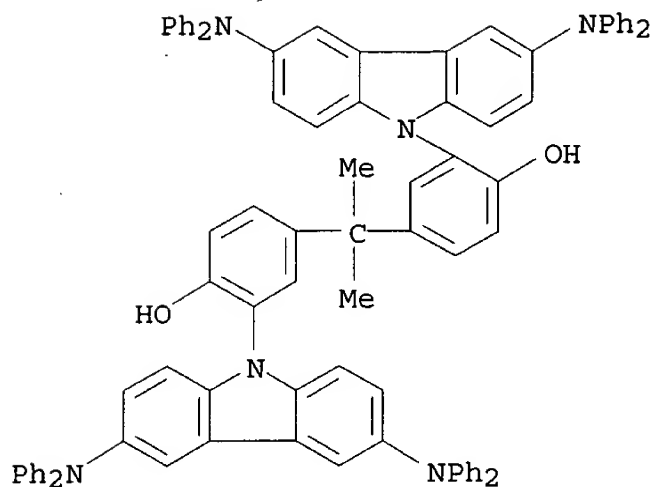
RN 149388-33-0 ZCAPLUS

CN Carbonic dichloride, polymer with 4,4'-cyclohexylidenebis[phenol] and 4,4'-(1-methylethylidene)bis[2-[3,6-bis(diphenylamino)-9H-carbazol-9-yl]phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 147614-18-4

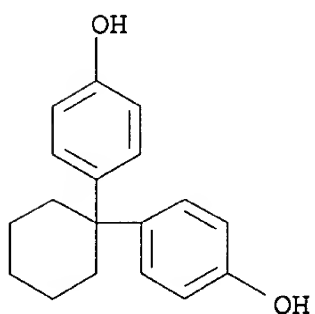
CMF C87 H66 N6 O2



CM 2

CRN 843-55-0

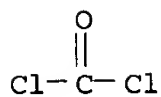
CMF C18 H20 O2



CM 3

CRN 75-44-5

CMF C C12 O



IC ICM C08G064-04
ICS C08G064-08; C08G064-12; G03G005-07

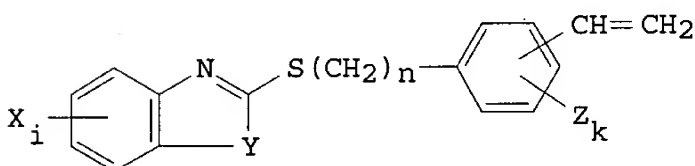
CC 74-3 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

IT 149388-31-8 149388-32-9 **149388-33-0** 149389-08-2
(binder and charge transport substance, for electrophotog.
photoreceptor)

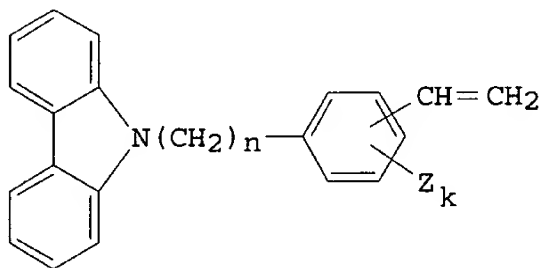
L20 ANSWER 25 OF 25 ZCAPLUS COPYRIGHT 2003 ACS

1990:441543 Document No. 113:41543 Vinyl monomer compositions and the manufacture of polymers with high refractive index. Matsuoka, Shingo; Amano, Masahiro; Kida, Yasuji (Tokuyama Soda Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 02029401 A2 19900131 Heisei, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1988-178184 19880719.

GI



I



II

AB Title compns. contg. heterocyclic vinyl monomers I or II (X, Z = Cl, Br, I; Y = O, S; i, j, k = 0-4) and comonomers whose homopolymers have $n > 1.560$ are polymd. to give plastics with high refractive index and excellent transparency, weather resistance, hardness, and dyeability, useful for lenses. Thus, a mixt. of 2-(p-vinylphenylthio)benzothiazole 50, styrene (homopolymer $n 1.590$) 50, and tert-butyl peroxy-2-ethylhexanoate 1 part was injected into a mold and heated at 30-90.degree. to give a colorless transparent product with $n 1.646$ and Rockwell L hardness 109, which could be tinted with disperse dyes, and showed no change after 100 h in a xenon lamp fadometer.

IT **128147-73-9P**

(manuf. of transparent, with high refractive index and hardness and weather resistance)

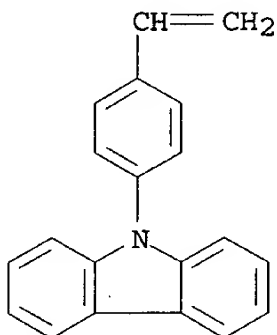
RN 128147-73-9 ZCAPLUS

CN 9H-Carbazole, 9-(4-ethenylphenyl)-, polymer with ethenylbenzene
(9CI) (CA INDEX NAME)

CM 1

CRN 52913-19-6

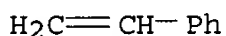
CMF C20 H15 N



CM 2

CRN 100-42-5

CMF C8 H8



IC ICM C08F012-32

ICA C07D209-88; C07D263-58; C07D277-74

CC 35-4 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 38

IT 128147-64-8P 128147-66-0P 128147-68-2P 128147-70-6P
128147-72-8P 128147-73-9P 128147-74-0P 128147-76-2P
128147-78-4P 128170-76-3P 128170-78-5P 128170-80-9P
128197-38-6P 128197-39-7P 128197-40-0P 128197-41-1P
128197-42-2P 128197-43-3P 128197-44-4P 128197-45-5P
128222-94-6P 128222-95-7P 128222-96-8P 128222-98-0P
128222-99-1P 128223-00-7P 128223-01-8P

(manuf. of transparent, with high refractive index and hardness
and weather resistance)